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HENRY E. SIGERIST
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HISTORY OF MEDICINE



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HENRY E.
S I G E R I S T
ON THE
HISTORY
OF MEDICINE

EDITED AND WITH AN INTRODUCTION BY
FELIX MARTI-IBÁÑEZ, M.D.

PROFESSOR AND CHAIRMAN, DEPARTMENT OF THE
HISTORY OF MEDICINE, NEW YORK MEDICAL COLLEGE,
FLOWER AND FIFTH AVENUE HOSPITALS, NEW YORK;
EDITOR-IN-CHIEF, MD MEDICAL NEWSMAGAZINE

FOREWORD BY
JOHN F. FULTON, M.D.

DEPARTMENT OF THE HISTORY OF MEDICINE,
YALE UNIVERSITY SCHOOL OF MEDICINE

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who, for one reason or another, could not be present. Such friendly and kindly gestures he made in full measure. This is well illustrated in the essay "A Boerhaave Pilgrimage to Holland," which records the two day celebration in September, 1938, at the University of Leiden in commemoration of the two hundredth anniversary of the death of Boerhaave. "The two days will remain unforgettable to all who had the privilege of attending the celebration. Europe was in a turmoil with every country mobilizing troops, but Holland seemed an island of peace." These phrases exemplify, incidentally, another of Sigerist's tenets, namely, that the history of medicine, or of any other science, should be portrayed in the framework of general history.

Similarly, no American medical historian can forget Dr. Sigerist's great valedictory address, "Medical History in the United States: Past, Present, Future" in which he reported with almost complete objectivity upon his fifteen year tour of duty in the United States, during which time he established the world's foremost center for historical studies in medicine in addition to inspiring dozens of other centers and individuals—junior students and senior colleagues in every branch of medicine—with the importance of the historical approach. In retrospect it seems almost inconceivable that one man could have accomplished so much in such a brief space of time.

Some have regarded it as a misfortune that he gave so freely of his time and energy that he failed to achieve the great object on which he had set his heart, namely, the completion of a formidable eight volume history of medicine written on new and original lines. There are others, however, who feel that he achieved much more through the inspiration of his essays and miscellaneous writings, many of which are reprinted here for the first time, than he might have through his projected history.

Sigerist approached true greatness as a writer because of his essential humanity. In his travels he gave as much attention to local cuisine and the *vin du pays* as he did to the customs of the people and their literary and cultural heritage. His prose, moreover, was lightened by a gay wit that has served as a source of endless delight to readers, young and old. In describing a dull book such as *An Essay on Tea* by Jonas Hanway (1757), instead of boring us with Hanway's lucubrations about tea, he draws a picture of the eighteenth century reformer as an entertaining eccentric who launched vast schemes, such as trying to reform penitent prostitutes and the Bank of England, but who incidentally was responsible for inventing that great British institution the umbrella. Hanway

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Figure references and figures were deleted from the following essays:

Bedside Manners in the Middle Ages: The Treatise *De Cantelis Medicorum* Attributed to Arnald of Villanova.

A Boerhaave Pilgrimage in Holland.

An Elizabethan Poet's Contribution to Public Health: Sir John Harington and the Water Closet.

A Literary Controversy over Tea in Eighteenth Century England.

time and space, blossomed freely. His mind, like Aristotle's, was a vast empire of culture incessantly lashed by gales of insatiable curiosity about the life around him.

But Sigerist's individualism was what made possible the legacy he left us, which will breathe with life as long as man remains man. His dynamic philosophy of medical history will help us, now and in the future, to face and resolve problems of health and disease by making the history of the past a key to that of the future, and the shining example he gave of courage, idealism, genius, and greatness, which, like a mountain shadow lengthening in the sunset, has grown only greater in stature since his death, will be an ever stronger inspiration to physicians the world over.

The greatness of Sigerist is manifest in the supreme humanism with which throughout his life he undertook almost superhuman enterprises. Prominent among these was the writing of his great history of medicine, which remained an unfinished symphony at his death.

Sigerist's greatness rests upon his having been a man, nothing more and nothing less, pledged to epic projects and great achievements, who never for an instant relinquished his human quality, possibly because he felt that there is no greatness higher than that of the human being who makes his life a supreme endeavor to renounce nothing, not even his simplicity. For greatness is simplicity. It is doing great things that change the life of mankind, keeping the spirit aloft in the heaven of ideals but retaining one's supreme personal simplicity, even in one's most glittering hours on the road to glory.

Physicians and students will continue far into the future to read Sigerist's works and to assimilate his ideas, as we all have done, making of his concepts a compass for navigating the broad seas of medicine. But only those who knew him personally can fully benefit from the memory of his presence and words, from that ineffable learning and feeling, thinking and working, dreaming and creating, that were his life and his example.

Elsewhere* I have recounted my memories of Sigerist during his visit to Spain and our last meeting in Rome. On these occasions, acquaintances and friends alike were amazed and charmed by this man who for years had been spiritual mentor to so many physicians and yet retained the enthusiasm and curiosity of a child, the sense of wonder, the enjoyment of life, the high spirits and strong emotions, and consequently the

* "Sigerist and Spain," *Journal of the History of Medicine and Allied Sciences* 13:244, 1958.

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nature instinctively rejects the routine and discipline that others less gifted have no difficulty in accepting.

Sigerist's work is a scattered mosaic whose pieces his disciples will some day assemble. It would be sufficient to arrange chronologically selected fragments of his articles—some day I myself may try to do this—in order to have a history of medicine far more effective and inspiring than anything Sigerist might have written after taming the winged Pegasus of his spirit into the plodding plow horse that the historian perforce becomes under the burden of compulsory regimented writing. Sigerist left a great history of medicine. All one need do to find it is look for it in his writings, his words, his life.

For a medical historian not only makes history with what he says and writes but also with his person and his thought. Like a catalyst of greatness, he inspires his surroundings. Sigerist made history because life for him was all light and clarity. No one will ever again be able to make medical history uninfluenced by Sigerist's ideas, which have become integrated into the thinking of physicians all over the world, thus stamping upon the beloved absent a supreme epitaph of universality.

In this book we present a selection of Sigerist's works as made by the author himself at my request some years ago, when I suggested to him the idea of publishing an anthology, together with some other pieces selected by myself as the best examples of his work. The selection he himself made at my personal request in March of 1956 faithfully reflects his personality. He left out some important works on medieval medical bibliography, in which he so greatly excelled, yet he included several delightful articles on such subjects as how to spell his name and how to prepare a truffled turkey on Thanksgiving Day. That he chose those articles for his anthology reflects better than anything else his great simplicity, his deeply warm nature, and his enchanting sense of humor. He never affected pompous postures. He was fond of life, kind, simple, and merry even in the hours of his greatest professional renown.

Our editorial efforts on these pieces have been focused on arranging them in some "chronological" order (by periods) and by subjects, with the object of helping the reader get his bearings. Otherwise, I have preferred to let the master speak in the way he was fond of, passing from one theme to another, alternating serious statements with humorous remarks, always in that friendly conversational tone characteristic of the true master who, unimpressed by his own learning, acts more like a companion than a tutor. I have preferred to let his thought—on whose

FOREWORD

AT the end of the final essay of this volume, "Thoughts on the Physician's Writing and Reading," Henry E. Sigerist gives us a truly Homeric confession of faith: "what I wrote I have lived, and it has enriched my life so tremendously that I thought others might benefit from my experience," or, to paraphrase the old aphorism, "I am a part of all I have read." This undoubtedly exemplifies the spirit of Henry Sigerist more aptly than any other sentiment in the volume. Also, these essays indicate that Sigerist was as greatly interested in men as he was in books—men of all lands, persuasions, and occupations—and so conscientious was he in maintaining lines of communication with his ever-widening circle of friends that, toward the end of his life, his correspondence became so vast that it interfered with his more serious writing.

During the summer of 1959, while attending international congresses in South America (physiology) and in Spain (history of science), my thoughts turned to him frequently, for, having seen him in action at many such international gatherings, I knew full well what they meant to him. He kept detailed notes about them and generally on returning home promptly sat down to prepare a report for publication. For him this was contemporary history, something that needed to be recorded, and his compulsions were such that he could no more go to a congress and not record it than he could attend an opera and fail the next day to tell someone about it. He never wearied of sending cards to those

from the narrow ambit of history considered as a mere chronology of dates on a single subject, so as to link medicine with the civilization of each epoch. Without talking of philosophy, he had one of his own, properly organized, that allowed him to integrate medical knowledge with all the other endeavors of man in time and space.

Prior to Sigerist, medical historiography, the study of the activities of medicine, suffered from being neither historical nor medical enough. Sigerist established from the start that the history of medicine must be first of all *history*, but always *medicine* as well. Its objective must be to serve the physician's vocation by stimulating him, enlightening him, and serving him as a tool and a system.

At the same time, Sigerist knew how to combine in a clear and entertaining prose the three ways of making history, namely, to describe the lesser facts, to narrate the important facts, and to interpret the basic facts. In his polished and lucid style, he made pleasing and friendly history, not grave and stern like the face of a professor of the last century, but cheerful and dynamic like the face of a young sportsman of our time.

This book contains all that and more. It affords a *complete* perspective of the history of medicine, requiring the reader only to fill in mentally the gaps between one section and the next in order to complete the span of the unfinished bridge that Sigerist started, and whose curve can be projected mentally to reach over to the other side of the river of history. This book also contains a philosophy and a dynamics of history, a historical methodology that can be applied to any historicomedical study. Above all, just as the breast encloses the heart, this book contains the soul of a man who, like a crusader for humanism, lived serving an ideal and died hoping for it.

FELIX MARTI-IBÁÑEZ, M.D.

New York City
September, 1959

was indeed the first to walk the oft-moistened streets of London armed with an umbrella; not being wholly sympathetic with the German-American Ph.D. tradition, Dr. Sigerist asks whether a good title for a doctoral dissertation might not be "From Hanway to Chamberlain, a History of the Umbrella in British Life." In Sigerist's hands the history of medicine thus became identified with humanism, albeit in somewhat unconventional form.

Even when his health began to fail, his outlook remained that of a young man; for him, everything was of interest and what he saw became history. For Sigerist, study of the past was the only sound way of anticipating what lay ahead in any field of human endeavor.

JOHN F. FULTON, M.D.

New Haven, Connecticut
September, 1959

out, the removed part of the body had to be brought back, the deity placated, and the demon expelled. The physician of primitive society was therefore physician, priest, and magician at one time. He is called medicine man, according to the designation given him by the North American Indians, or shaman, as he was called in the Siberian tribes. His life was a hard one. He was paid according to the success of his treatment. If the patient died, he might be suspected of having caused the harm himself. Being skillful in the art of magic, it was believed that he was able not only to remove a spell but to do harm as well by means of magic. In many tribes shamanism was hereditary; in others one was born to be a shaman. Particular events at the time of birth (a child being born with a tooth) or events in early childhood (a child having survived an accident which otherwise would have been fatal) seemed to designate a child as a prospective shaman. The young one was trained by another shaman until he was consecrated and became independent. In some African tribes the medicine man was a farmer like the other members of the tribe and practiced his art only occasionally, while in most other tribes the shaman lived a segregated life, apart from the other members of the tribe.

In Babylonia the physicians were priests. The Babylonian civilization had an entirely religious character, and all sciences were a part of theology. Their purpose was to keep the gods benevolent or to placate them if they were offended. In order to know the intentions of the gods, one had to observe and interpret the omens, the signs through which the gods revealed their intentions. All Babylonian sciences started this way, and so did medicine. The priest-physician watched the stars, a flickering flame, a drop of oil poured into water, the organs of sacrificed animals, in order to know what the fate of the patient would be and to be able to counteract it. Omens, however, were not only the phenomena just mentioned but the symptoms of disease as well. These, too, had to be observed carefully and given a meaning. They were described and studied with great care, and in this way rational possibilities were given to medicine without leaving disregarded the religious attitude. The treatment consisted chiefly of incantations, and a great many texts give a very graphic description of the priest-physician dressed in the red cloak, a raven in one hand, a falcon in the other, pronouncing the incantation over the patient.

At all times the physician's profession gives him power. He knows poisons—chemical, physical, biological forces of high potency are given freely into his hands. Secrets are divulged to him, which also gives him power over the patient. A misuse of this power is a serious menace to

INTRODUCTION

THE MIND OF A MAN

THIS book is, by the power of the enlightening words it contains, an immortal mirror of the luminous mind of a great medical historian. But perhaps the best homage I can pay Henry E. Sigerist is to say simply that this book is a monument to a Man.

To be a man and to deserve such title is very difficult nowadays. In times when society was based on individualism, as in the Renaissance, the man who ventured to assert himself held in his hand the winning cards in the game of life. This is why geniuses like Leonardo and rogues like Casanova triumphed in the early centuries of the modern age, some through the magic of genius and others through sheer rascality, but always through their fiery individualism. Today, to try to be a man, to be faithful to Pindar's dictum, "Become what thou art," to be loyal to one's own real personal and inalienable destiny, is highly dangerous and, though sometimes it leads to victory, is often a road to ostracism.

Henry Sigerist was, in his own words, "a nonconformist," a *homo universalis* who even in the heyday of the empire of "the masses," whom he loved dearly and to whom he contributed so much, never renounced his personality, his ideas, or his passionate individualism, although he knew how harmful to him this could be among the Pharisees. Possibly his individualism was one of the intimate factors that resulted in his being hemmed in by adverse circumstances and prodded into seeking the peaceful environment of palm and vineyard under the azure skies of Switzerland. Over there, his dynamic spirit, unrestrained by frontiers of

The Greek physician, however, was a craftsman. He received his training by going to another doctor as an apprentice. Like the other craftsmen, he traveled a good deal and practiced his art while wandering. There were not many doctors in ancient Greece; only the larger cities had their own doctor, whose salary was raised by a special tax, and who was in the city service. In times of war or epidemics, special physicians were appointed, but all the smaller places had no doctor, and the medical service was given exclusively by wandering physicians who happened to come to such a place.

We do not like the idea of a Greek physician being a craftsman, going from one city to another, knocking at the doors, and offering his services as a shoemaker or a blacksmith would. And yet there is no doubt that that was the case. Several Hippocratic treatises give us very enlightening accounts of such occurrences. There was very little privacy in the relations between doctor and patient. The doctor's shop, the *iatreion*, like other craftsmen's shops, was open to everybody, and medical questions were discussed publicly in the market place. When it happened that two doctors came to the same town at the same time, a wild competition was the result of such a coincidence. Again, the Hippocratic writings tell us how many doctors tried to attract the patients' attention by dressing extravagantly, being profusely perfumed, and by displaying showy instruments. Dr. Ludwig Edelstein has demonstrated very convincingly that the art of prognostic developed in Greek medicine to such an extent chiefly on account of these peculiar conditions in medical practice. The doctor who came to a small city generally was unknown to the population. The best way to secure a good reputation was by making correct prognoses and by telling the patient right away what his disease was without even asking questions.

Being a craftsman who worked for his living, the social position of the Hippocratic physician was not a high one. And yet of all craftsmen he undoubtedly was one of the most highly esteemed, and this was on account of the attitude of the Greeks towards the human body.

The Greek world was a world of the healthy and sound. Health appeared to be the highest good. The ideal man, to the Greeks, was the harmonious being whose balance in soul and body is noble, beautiful, and perfect. Disease was considered a great curse because it removes man from the condition of perfection and makes him inferior. The physician, therefore, whose duty it is to maintain and restore health, was as highly esteemed as a craftsman would be.

ability to convert the dry faded herbarium of medical history into a sunlit garden filled with the fragrance of roses and the hum of bees.

Sigerist was a *great* man, which is far superior to being a "big" man. This greatness of soul and mind of Sigerist moves me to say here something that to some may sound like heresy, but that I, sincerely believing it to be the truth, dare lay reverently upon his, in our memory, eternally warm ashes: the best of Sigerist perhaps would be not a long, formal history of medicine but the articles and papers, now scattered like flocks of restless birds, that he published in his lifetime, some of which are collected in this anthology.

Many people deplore the fact that Sigerist never completed his monumental history of medicine. I do not think he would have ever finished it. Had he done so, I do not think, great though it would have been and undoubtedly the best work of its kind, that it would have been *the best* of Sigerist. Besides, I think that Sigerist *did* write such a history. One need only peruse his works to prove that. It is not a history written in the chronological order and organized form beloved by some, but in the way he himself preferred, that is, in articles varying in theme and occasion but unified by the thought that inspired them.

Sigerist's work, his articles and lectures, lead by paths full of beauty and precision to all the problems of the history of medicine. When Ortega y Gasset died, some people regretted that he did not leave a complete treatise on philosophy. Dr. Gregorio Marañón remarked at the time: "What could a circumstantial and dogmatic treatise add to that infinite curiosity and clarity that he [Ortega] put into everything?" Very true. Similarly, Sigerist did not leave a complete history of medicine possibly because there was no need to do so, just as Einstein did not need to leave a complete treatise on physics to ensure his immortality.

As a matter of fact, geniuses rarely have the patience, time, and desire to leave "complete" works on the favorite subject of their vocation. It seems as though the genius were fated to be a sublime catalytic agent that creates, inspires, and stimulates but rarely has the opportunity—denied by his life or restlessness—of devoting sufficient years to creating a definitive work on his specialty. But even if he produced such a work, it could never capture the brilliant light that the genius flashes forth in his moments of creation.

Geniuses are rarely good scholars in childhood—as witness Santiago Ramon y Cajal, a very poor student, who failed in anatomy, yet later became the genius of neurohistology—perhaps because their creative

The position of the sick man and the physician in society was radically changed by Christianity, which came into the world as the religion of healing. The new teaching appealed to the sick, the weak, and the crippled, in sharp comparison with the old religions, which were essentially for the sound and pure. It promised healing both spiritually and physically. Did not Christ himself work cures? While in the Semitic world disease was considered a punishment for sin, while among the Greeks it produced inferiority, in the Christian world disease meant purification; disease therefore became *grace*. The sick man is a person who has obtained a share in the grace of God. Taking him in is the duty of the Christian and benefits the soul of him who does the good deed. Hospitals were erected, and, from the sixth century on, the convents and monasteries made the sick their especial care. But the care of the sick is not medicine, Christ had cured without drugs. There was hardly any room for the physician in early Christian society, and Greek medicine was considered pagan art. Christian pupils of Galen were excommunicated because they devoted their time to this heathen science. Over and over again, one endeavors to justify the physician by quoting the words of Ecclesiastes, according to which the physician had to be honored because he was a necessity, and because he, too, was a creature of God. Recognizing that the sick people could be taken care of much more efficiently not only by nursing them but by giving them medical treatment, the church reconciled itself with ancient medicine. Cassiodorus, the great chancellor of Theodoric, in the sixth century, had medical books in his library, and the Benedictines, following his example, began studying medicine also.

In the early Middle Ages most of the physicians were monks. Monasteries had special rooms devoted to the care of the sick, and the cloisters became centers of medical study. There in the cloisters medical books were copied, were compiled, and it was not always done uncritically. A monk in the monastery of St. Gall, copying the herbal of Pseudo-Apuleius, left out all the plants that did not grow in his country, and replaced them by describing native herbs. The medical literature of the early Middle Ages, however, was not original. It was chiefly compiled from ancient sources, but in this way Greek medicine and the principles of Greek therapy were observed.

As these medieval physicians belonged to the clergy, their ethical standards were directed by the church, and continued to be so directed in the later Middle Ages as well, when a great many laymen had joined the

mighty wings the sun of ideas shone as fiercely as the sun on the far-reaching wings of the condor—range over time and space, continents and ages, facts, figures, things, and *places of history*—the history not only of medicine but also of civilization.

Sigerist's great innovation is to have made the history of medicine a facet of the history of mankind by linking it with the history of the culture, art, creeds and philosophies, economy, technology, and sociology of each period, thus binding the physician's endeavor to man's yearnings, struggles, and conquests in each historical epoch. This great contribution of Sigerist's as a historian can be compared only with the impact that his presence, speech, and example as a man made on all of us who knew him.

Sigerist considered medicine to be a science natural in its methods and social in its objectives. He placed medicine among the social sciences by making it responsible not only for preventing and healing disease but also for protecting the health and well-being of mankind.

The history of medicine was to Sigerist a powerful tool with which his mighty hands carved a statue to human well-being. His history is no mere story about a coin, a parchment, an instrument, a statue, or a building. He was a true artificer of history, in whose hands everything instantly acquired a dynamic character and was illuminated by the vivid light of our own time.

Let us emphasize that dynamic character, of *living* history, in Sigerist's work, for it illuminates all the writings contained in this volume. From the sunny sands of the island of Cos, just as from Boerhaave's Amsterdam, Harvey's London, or Paracelsus' Zurich, Sigerist knew at once how to extract an inference applicable to our own age, a lesson of enormous practical value to the present-day physician.

History with Sigerist was never a static investigation of the past, but a dynamic exploration of the present and an anticipation of the future. He made history because history to him was learning from the past how to interpret the present and anticipate the future. History never repeats itself; hence we must know it in order to re-create it at each instant with our effort. A sociologist of medicine, Sigerist always bore in his heart the longing to help every man by offering him the best that medicine could do for his health and well-being. For him medicine was not so much the healing of disease as its prevention and the promotion of health.

But what I admire most in Sigerist is his concept of the history of medicine as a facet carved on the immense quarry of the history of civilization. From his earliest works, Sigerist knew how to get away

practice. The candidate had to pass an examination in Salerno, after which a license was delivered to him.

Salerno was the first medical faculty of the occidental world. It was followed by the institution of universities all over Europe. The twelfth and thirteenth centuries brought a great many new translations of medical books from Arabic into Latin, and it became the chief task of the universities to interpret and assimilate the new literature. The method was the Aristotelian dialectic, and the result was scholasticism in the West as it was in the East. Medical education was purely theoretical.

It would be a mistake to assume that medical practice was chiefly magical in the Middle Ages. There was a religious medicine, to be sure, as there always was and still is. And it is obvious that in a period in which all sciences were dominated by theology, the religious element in medicine was stronger than at other times. The principles of medical practice, however, still were the principles of Greek medical science as is clearly shown by the medical textbooks and by the *Consilia* in which the physicians discuss definite cases.

In the thirteenth century we encounter a very highly developed surgery, the roots of which are hard to trace. The reason for this is that at this time the surgeons in Italy were educated at the universities, and wrote textbooks, while before, and outside of Italy, the surgeons were uneducated craftsmen who did not write. Surgical operations had always been performed, but we do not hear of them. Surgery has a different tradition from that of medicine. It is to a very large extent independent of any literature and is transmitted by word of mouth from father to son, and from master to pupil. In most countries of Europe, the surgeons, like other craftsmen, were organized in guilds. They were barbers, were bath keepers in the German countries; their field was limited to the treatment of wounds, to the lower surgery. In the beginning of the thirteenth century, the *Collège de St. Côme et St. Damien* was founded in Paris. Its members were divided into two categories—the surgeons of the long robe, among whom there were still clerics, and those of the short robe. There were endless conflicts between the surgeons themselves, and between surgeons and physicians.

From the founding of the universities on, the physician was a scholar, a doctor, and has been so ever since. In the Christian Middle Ages, professions were considered vocations, divine missions from which definite duties towards God and one's fellowmen were derived. The rise of capitalism brought in a different conception. Economic aspects were stressed.



ON MEDICAL HISTORY

very few physicians ever became wealthy, the majority of them had a decent income that made it possible for them to give free medical care to the poor. For a considerable time, the hospitals were exclusively charity institutions, and it was quite obvious that in most cases the doctor did his hospital work without any remuneration. I still remember the time when, in Europe, the doctor did not send bills and received from the different families certain amounts of money for Christmas.

These times have gone. The world has changed, and the medical profession today is undergoing one of the greatest revolutions in history. It is a revolution not of medicine but of medical service. During the nineteenth century, the profession was absorbed by research problems. Medicine has made more progress and has become more efficient than ever before in history. While all efforts were tending towards advancing our knowledge of the disease mechanisms, comparatively little was done to organize medical care. And, as a matter of fact, little had to be done, as medical service kept on being efficient by following traditional lines.

The situation is entirely changed today. And it is so changed for different reasons. Medicine has become more and more technical and more and more specialized. During the eighteenth century the faculties of the medical schools began to devote more and more of their activities to medical research. In the nineteenth century, the research methods became greatly complicated, and the consequence was that the research worker necessarily had to specialize. The result of this specialization in research was that teaching, too, became more and more specialized, as most of the European universities had the principle that a medical subject should not be taught except by men who had done active research work on it. In 1833 Johannes Müller was appointed in Berlin as Professor of Anatomy, Physiology, and Pathology. After his death, the chair had to be split up into three chairs. The next step, finally, was the specialization of medical practice, which is still increasing.

Specialization in medicine is not a new phenomenon. When Herodotus traveled in Egypt in the fifth century B.C., he found specialists everywhere—doctors for all organs and for all diseases. The same occurred in the Roman Empire. While Hippocratic physicians were general practitioners, in the last centuries of the Roman Empire there were specialists everywhere in Rome. This means that in all civilizations a point was reached in which medical knowledge seemed so vast that it could not be mastered by one single man, and specialization followed of a necessity. Through specialization, medicine today has become more efficient than

THE PHYSICIAN'S PROFESSION THROUGH THE AGES

THE characteristic features of the medical profession are determined to a very large extent by the attitude of society towards the human body and by the valuation of health and disease. The scope of medicine was always the same: to cure disease and eventually to prevent it. Medicine always meant service; therefore at all times certain qualities were required of the physician—readiness to help, knowledge concerning the nature of disease, and skill in curing the sick man. However, the medical ideal was a very different one in different periods of history, determined by the structure of the society of the time and by its general conception of the world.

Primitive medicine had a very complex character. While light ailments needed no particular explanation and were treated by the patient or his relatives by drugs, special diets, and other rational means, serious ailments had to be explained, and the explanation was magical or religious. It was believed that somebody had done harm to the patient, and this somebody might be another man or a demon, causing the harm by introducing an object into the body of the patient by means of magic, or by removing something essential to life. In other cases it was believed that the deity had sent disease as a punishment for sin, or that a demon had taken possession of the patient's body. According to these views, the therapy was either magical or religious, for an object had to be taken

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Delivered before The New York Academy of Medicine, October 18, 1933.

The doctor, in most cases, still was paid according to his individual services, and as the insurance companies had not unlimited means the fees sometimes were very inadequate. On the other hand, abuses on the part of the patient as well as the physician occurred, so that both patients and doctors had to be controlled. The result was a huge administrative machinery with endless red tape.

The next step in the development was the one undertaken by Russia, where the whole working population is insured against sickness, and where the same position is given to the doctor as the other professions, the priest, the judge, the teacher, already have in other countries.

We medical men have a strong *esprit de corps*. We have a glorious history, and we are justified in being proud of it. What unites us is that, unlike other professions, all of us, whether we work at the bedside, in the laboratories, or at the writing desk, have but one purpose: to benefit the sick man. We have developed strong professional organizations from the very beginnings of our history. The Greek doctors had their guilds, their codes, and their ethics, as did the medieval surgeons. The medieval physicians were members of their faculties, which were very powerful organizations. From the sixteenth century on, medical societies developed, which today all over the world are very influential bodies. All this necessarily makes us very conservative, but we must have the courage to face the present day situation openly. We must not be afraid of words, which so often are incorrect, and the meaning of which is not seldom obscure to those who use them. We have a very absorbing profession—from the first day we enter medical school, we have to work hard, and this leaves us little time to see or to watch what is going on around us. And in this way it might happen that many of us have not quite realized how fast the world is changing its aspect. *There is a strong trend away from individualism.* Health and disease are no longer considered a private matter of the individual. In many countries, laws have been made to enforce health. Society more and more feels responsible for the welfare of all its members. It has placed the means of retaining or regaining health within the reach of everyone, and in return it may well demand health of the individual. We may like this development or we may dislike it, but we cannot help it. All of us are dependent on each other. If large parts of the population suffer, it is quite obvious that the rest will be affected by it. To us medical men, the idea that one sick organ affects the whole organism should be familiar.

There is one lesson that can be derived from history. It is this: that the

society, and so at all times society endeavored to protect itself by establishing rules regulating the physician's behavior. The first regulations of this kind are found in the Code of Hammurabi (2000 B.C.) where a tariff is established. The surgeon's fee varied according to the social standing of his patients. Moreover, the surgeon was declared liable for his doings, and in case of a fatality in an operation his right hand was cut off. We find similar regulations in ancient Persia, in one book of the Avesta, the Videvdat, which contains extremely interesting regulations according to which a surgeon was not allowed to practice before he could show three successful operations performed—not on Parsees, but on infidels.

In Egypt, the physicians belonged to the class of the scribes. They, too, were sometimes priests, but not exclusively, as was the case in Babylonia. They received their medical training in the schools connected with the courts, the chancelleries, or the temples, the most famous of which were in On, Memphis, Thebes, and Sais.

When the Greeks began to travel to Egypt, they recognized in the Egyptian god of healing, Imhotep, their own Asklepios. Yet there were two entirely different deities—Imhotep, originally a man, a great scholar and architect, who lived in the time of King Doser, and who afterwards was heroized—Asklepios, on the other hand, a local demon in Thessaly, a chthonic deity. According to legend, Asklepios was cut out of his mother's womb by Apollo, whose arrows had killed her. The child Asklepios was brought to the cave of the centaur Cheiron, who taught him the medicinal virtues of herbs and many incantations. In this way, Asklepios became a physician who cured many sick men, and he even resuscitated some who were already dead. Zeus struck him with his thunderbolt for such presumption.

This legend has a deep meaning. It means that the physician's interfering with the laws of nature is not obvious but represents an enormous hybris. And Plato still felt the necessity of justifying the physician through the argument that the state needs healthy citizens. Asklepios was worshipped in many temples, and it was believed that his priests, the Asklepiads, were the first doctors of Greece. This, however, is not correct. The medical practice in these temples consisted in miracle cures. It was a purely religious medicine, which has nothing at all to do with the healing art that originated in the schools of the pre-Socratic philosophers and found its highest expression in the school of Hippocrates. The Hippocratic physicians called themselves Asklepiads also. They did so because they were organized in a kind of guild, the patron of which was Asklepios.

THE PHILOSOPHY OF HYGIENE



SIR William Osler called the nineteenth century the century of preventive medicine. There can be no doubt that it was in the field of prevention of disease that modern medicine attained its greatest achievements. Our life is no longer shortened by diseases such as leprosy, plague, smallpox, and rabies. Our life expectation is about twice as long as it was half a century ago. Great masters of the science of public hygiene, among whom William T. Sedgwick was one of the outstanding figures, have improved the methods of the applied science of practical sanitation. In all countries of the world great sums of money are spent every year for the improvement of sanitary conditions, and never has money been so well invested. We have decided to combat disease with all means available. A gigantic battle is going on all over the world against disease, the most dangerous enemy of mankind. The watchword is the dictum of Hermann T. Biggs, which became the device of the Department of Health of New York State: "Public health is purchaseable; within natural limitations, any community can determine its own death-rate."

In 1924, Dr. William H. Welch delivered the Second Annual Sedgwick Memorial Lecture. It must have been an unique experience to hear a leading American prime mover of public health pay tribute to the life work of a colleague in the same field. Dr. Welch spoke on the theory

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Sedgwick Memorial Lecture, delivered at the Massachusetts Institute of Technology, December 1, 1924.

In the Homeric writings, already we find that often-quoted verse, that a doctor is a man who is as valuable as many other men combined.

In Rome, the first physicians were slaves whose medical knowledge was very primitive. From the fourth century B.C. on, Greek physicians began to immigrate. They were adventurers, mostly, and were strongly opposed by the Romans. Their superior knowledge, however, was soon recognized, and frequent wars necessitating a great many army surgeons had the result that the policy towards the foreign physicians was entirely changed, and that they were attracted to Rome as much as possible. In 46 B.C., Julius Caesar presented all free-born Greek physicians on Roman soil with the right of Roman citizenship, a great present indeed. Augustus knighted his body-physician Musa. The privileges accorded to physicians became still greater. The doctors were free of taxation, free of military service, and free of the duty of taking lodgers and of accepting offices. But now the great question arose: who is a physician in antiquity? There was no state control of any kind, no university which could deliver a recognized degree. The greater the privileges, the more tempting it became to call oneself a physician in order to obtain them. So a certain amount of restriction became necessary, and in the time of Antoninus Pius a *numerus clausus* was introduced, according to which in all Roman cities only five, seven, or ten doctors, according to the size of the city, should be so privileged. These were called the *valde docti*, and in order to attain to that rank they had to prove that they possessed medical knowledge. In this way a kind of license was instituted, which guarded the rights of competent physicians.

In Roman times, many families had their family physician. They gave him an annual salary for which he treated the whole family during that year. A body-physician at court got a salary of about \$12,000. But we hear of physicians in the capital whose annual income amounted to about \$35,000. And there were physicians and surgeons who charged as much as from \$2,000 to \$10,000 for their special cures or operations. This of course was exceptional.

Through inscriptions we know that there were medical societies in the Roman Empire. Their chief purpose was the common cult of their patrons Aesculapius and Hygieia. Some of these societies, however, endeavored to improve the physicians' knowledge and to stimulate their zeal. The medical society of Ephesus had annual prizes for the most brilliant cure effected by one of their members during the year, or for the invention of the best surgical instrument.

presence of his god, be clean. Of course, this cleanliness was meant to imply spiritual cleanliness. But it was necessary that this spiritual cleanliness should have an outward expression. The priest was robed in spotless garments. He avoided touching unclean things, and so the man who came to the temple in order to worship his god had to be clean also. Although the cleanliness was taken in a spiritual sense, it had great hygienic consequences. All ancient cults demand such a cleanliness but these precepts are probably most distinctly defined in Leviticus, where we find a great many regulations concerning the daily life of the Jew. These laws were not based upon hygienic reasoning, and yet they served to improve hygienic conditions vastly. Thus it was postulated that only clean animals should be set apart to be eaten, that such animals should be slaughtered alive with an unnotched knife, and that only animals were to be slaughtered that had no disease or injury. In this way only sound cattle were slaughtered and the method of slaughtering ensured free bleeding, so that the meat was better preserved.

It was much the same with the other laws. The man who becomes unclean must be purified before he steps into the temple, and the ritual of purification required that the clothes of the impure man be washed and that he himself had to bathe. Uncleanliness is contagious. Whoever touches an unclean man becomes impure himself. The menstruating woman was considered unclean for seven days. The woman in labor was unclean from the moment her pains began and remained unclean for forty days after delivery if her child were a boy and eighty days if it were a girl. Man becomes unclean by pollution. Gonorrhea was known in the ancient Orient. The man who had a discharge from the urethra had to take his place outside the camp. All his possessions were considered unclean, and he himself remained impure for seven days after the discharge ceased. Then he had to purify himself by washing his clothes and bathing. Impure to a still greater extent was the man who suffered from a disease called *Zaraath*, which probably included leprosy. The man suspected of having the disease was to be reported. He was brought forth to the priest, was examined and isolated. When, in the Middle Ages, leprosy became widespread all over Europe and physicians felt themselves unable to combat the scourge efficiently, it was the church that fought the disease by applying the prescriptions conveyed in Leviticus. Lepers were isolated everywhere, and when, in the fourteenth century, a great epidemic of plague ravaged all Europe the same principles were followed. In this way, the leading motives of public hygiene were derived not from medi-

medical profession, because doctors and patients, whether clerical or lay, were first of all Christians. The church declared it the patient's duty to consult a physician. The sick man who avoided treatment harmed himself. To harm oneself is sin, just as suicide is sin. Medical service is to preserve life, just as eating and drinking does, and it is the duty of a Christian to do whatever he can to preserve the abode of the soul. A Christian patient could not call in an Arabic or Jewish physician. If he did so, he was apt to be excommunicated. The superiority of the Arabic and Jewish physicians, however, was so evident that it was impossible to enforce this rule. On the other hand, it is the doctor's duty to treat all the patients, even hopeless cases. In sharp contrast to this were the ancient Oriental and Greek conceptions, where the doctor considered it unethical to attend a case in which his help would be of no use. It was further declared to be the doctor's duty to give free medical treatment to poor patients, and in some cases even to provide them with drugs gratuitously. The doctor was made liable for his doings, and it was his duty to follow the traditions.

The church, however, did not approve of its ministers occupying themselves with medicine. After all, medicine was a worldly art. Surgery was considered particularly unsuitable for the priests, because any operation might be fatal, and the priests were not allowed to undertake anything that could lead to death. From 1131 on, edicts were passed restricting the clerics from medical work. The fourth Lateran council in 1215 forbade the priest taking part in any surgical procedures. The surgeons, therefore, were more and more frequently laymen.

In the tenth century a medical school began to develop in Salerno. It flourished in the twelfth century under the inspiration of the new translations of medical books that were made from Arabic into Latin. The Salernitan school was not founded by the church. The doctors were laymen as well as clerics. The chief importance of the Salernitan school lies in the fact that it created a new literature which, although it was not original in itself, following ancient and Arabic sources, still improved considerably the medical knowledge of the time. In 1224 the Emperor Frederick II published decrees regulating the medical conditions of his empire—decrees which are particularly interesting, as it is the first time in European history that medical practice was strictly regulated by public law. The right to practice medicine was made dependent upon the ability to pass certain requirements. The medical curriculum comprehended three years' study of philosophy, five of medicine, and one of

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A profession became more and more a means to earn a living. To the honor of the medical profession, it must be said that the old medieval conception of the profession has been preserved to our day, more than with most other professions. I have never heard of an engineer building a bridge without remuneration. And yet, from the sixteenth century on, the economic aspects were more and more influential in the development of the profession.

The physicians recruited themselves from the middle classes. The best that could happen to them was to be body-physician to a person of high rank. This gave them a definite income, and thus the opportunity of devoting much of their time to charity work. The monarch had a whole staff of body-physicians and surgeons, and the aristocracy, whether worldly or ecclesiastical, followed the monarch's example. In the more democratic countries, like, for instance, Switzerland, a doctor was attached not to the court of a nobleman but to a family or a group of families. The family physician is the democratic form of the body-physician.

The rise of democracy at the end of the eighteenth and in the nineteenth centuries abolished the class privileges; the profession was open to everybody. Individualism and liberalism became evident. Health and disease were considered a private matter of the individual, so much so that in Germany in 1869, at the instigation of the Berlin Medical Society, medical practice was opened to everybody, even to those who had never studied medicine. This is a typical example of nineteenth century liberalism. The law was justified by the arguments that there always had been quacks, and there always would be, that man had a natural right to choose his healer, and that the people, being reasonable, would know how to distinguish a real doctor from a fake one. Rudolf Virchow was responsible for this development to a very large extent.

Democracy undoubtedly was a great advance. It gave everybody a chance. And, as the great Christian humanitarian ideals were fully alive, a successful man felt his obligation to help those who had not been successful in life. A great deal of charity work was done; more hospitals were erected than ever before.

In the nineteenth century the doctor was a member of a highly respected liberal profession. An academic education was highly regarded and rewarded its owners with great social privileges. The natural sciences had developed by leaps and bounds, and the doctor, being a representative of the natural sciences, was so much the more esteemed. Although

that this hygiene was not general. It affected only the upper social strata. The great mass of the common people, the slaves, farmers, and laborers, had no part in it.

While the Greeks upheld a code of personal hygiene which was to be the model for all times, it was the merit of the Romans to develop public health. An effective public health organization is possible only where there is a strong and steady government. Greece was split up into little states which were fighting each other all the time. In Rome, the conditions were much more centripetal. Roman organizing power gave a tremendous impetus to public health. As far back as the time of the kings, laws were passed ordering that the dead be buried outside the town. We can still see the mighty arches of Cloaca Maxima and the great aqueducts. On eleven aqueducts, through eighteen conduits, water was brought to the city. Four are sufficient today to make Rome the city having the best water supply in Italy. Descriptions of the city of Rome in the fourth century A.D. tell us that at this time the city could show eleven great *thermae*, 856 baths, 1352 water basins and fountains, and fifteen sources. Nearly every house had its own water cistern, and from 11 B.C. on no tax had to be paid for the water.

With the passing of antiquity personal hygiene deteriorated. Where hygiene was to be a means it became the goal in itself. The result was contrary to what was intended: sports became athletics; bathing was no longer a means of being clean but led to effeminacy. The world had grown decadent.

Christianity produced a strong reaction. The new religion found its disciples chiefly among the lower classes of the population who took no part in hygiene or, at least, a very small part, and first of all Christianity had an entirely different attitude toward the human body. The Christian conception was strictly dualistic; mind and body are in opposition, and what matters is the soul. Why, then, care for the body, i.e., the earthly, sinful part of man? It is obvious that such an attitude was not favorable for the development of hygiene. The great hygienic achievement of antiquity vanished not merely because the first centuries of the Middle Ages were hard times, troubled by wars; it vanished chiefly because of that different attitude. And yet in the Middle Ages, too, people wanted to lead a healthy and joyful life. It is true that the body is the perishable part of man, but it is the abode of the soul and is therefore to be preserved and to be cared for too, whence the church reconciled itself with medical science and attempts were made to improve sanitary conditions.

ever before. And yet it certainly has its disadvantages. The physician who, his whole life long, deals with a limited group of diseases becomes necessarily one-sided. The patient, on the other hand, who in the beginning of specialization used to consult a family physician first and was eventually sent to a specialist through him, today makes the diagnosis of the affected organs himself, and it is he who decides to which specialist he shall go. A very promising attempt to find a way out of this situation is the development of group medicine, where doctors of different specialties join to form a clinic.

What made medical progress possible was the gigantic development of the natural sciences. There was extraordinary development at the same time, in another field—in technology—and the result of this was the industrialization of the modern world. The same elementary force that made medical progress possible had changed the aspect of the world so profoundly that the doctor has difficulty in finding his place in this new world which is ruled by iron economic necessity. The number of doctors grew, and a ruthless competition arose. While the doctor of yesterday did not need to bother about his bills, today he has to merchandise his services. He has to find out what the cash value is of each service he performs, just as a grocer has to do. The more efficient medicine became the more complicated and the more expensive it was, and the more difficult it was for the doctor to give free medical care. Today, therefore, we are in the very serious situation that we run the risk of seeing a great effort wrecked by maladjustment.

Long ago an attempt to deal with this situation was made in Europe by the introduction of social insurance. Sickness insurance was introduced first in Germany not by the socialists but by Bismarck and the conservatives, which is very often overlooked. Sickness insurance for the community is the cheapest way to take care of the poor patients, because it makes them take care of themselves by saving part of their wages in case of sickness. There can be no doubt that the sickness insurance in the different European countries has had very remarkable results for the people's health. Germany, soon after a lost war, famine, revolution, had health conditions that were just as good as those existing in the victorious countries. And the compulsory sickness insurance is surely to be made responsible for this, to a very large extent. And yet it is beyond question that the different insurance systems, as they are working in Europe today, had very serious drawbacks. A new type of medical service was created, but one that endeavored to preserve the old forms as much as possible.

police laws. This was a mode of hygiene which might be defined as "hygiene from above."

But at the same time a new trend is noticeable with the awakening which gripped the masses during the eighteenth century. In 1762, Jean Jacques Rousseau's *Contrat Social* appeared. It is in strong opposition to the concept of absolutistic government. Rousseau thought that all men are good by nature, that they are ruled from above with tyranny and corruption. The people are unhappy because they are not enlightened; they are ill because they are ignorant. They must be enlightened about everything that concerns health and disease. From above nothing of good can come to the people; they must help themselves, and they can do it because they are reasonable. Thus a "hygiene from below" starts in. A tremendous mass of literature appears, a great many periodicals are founded, designed to teach the common people methods of hygiene. These are theories which finally led to the French Revolution.

The same trend can be observed in this country, where the philanthropists, first of all Benjamin Franklin and Benjamin Rush, devoted much work to improving the health of the common people. The most famous health catechism of the time, written by a German physician Bernhard Christoph Faust, in 1794, was translated into English and adapted to American conditions at the instigation of Benjamin Rush and Dr. Woodward of North Carolina. Four years after, the initial appearance of the book in the American edition was made in New York.

About the same time the child was discovered, and so we find a strong movement toward child welfare. The child must be liberated too; it had been left to the care of nurses and tutors who had no understanding of its needs. Problems of education were hotly contested. The philanthropist endeavored to detach education from religion, at least from the positive religion which was to be replaced by a natural theology. And then the century closed with the great discovery of vaccination.

After the French Revolution there was a reaction not only in the political realm but in hygiene as well. In the eighteenth century, everybody was interested in problems of hygiene and common welfare. In the beginning of the nineteenth century, the bourgeois became rich and was not much interested in his fellow men. But at that time a new revolution became manifest, the Industrial Revolution. New machines greatly modified the whole structure of society, the population increased tremendously, and great masses of the people lived under most miserable conditions. A new class was formed, the industrial proletariat, among whom

physician's position in society is never determined by the physician himself but by the society he is serving. We can oppose the development, we can retard it, but we will be unable to stop it.

The history of the medical profession today has reached a crucial point, and it is our duty to save the efficiency of a noble profession that not only has a great past but a still greater future. I would like to close by repeating what I have written once before: never before has society presented the physician with so wide a field of activity and with so much influential power. If never before, certainly today the doctor may become a statesman, the *Asklepios politikos* visualized by Plato.

makes it very difficult to fight them openly. In order to be successful, therefore, a campaign must start **by changing** the whole attitude of the population towards the disease.

From whatever angle we approach these problems, over and over we find that hygiene and public health, like medicine at large, are but an aspect of the general civilization of the time, and are largely determined by the cultural conditions of that time.

and practice of public health. He gave an admirable historical review of the medical ideas which made the great achievements in public health possible. I will not repeat what Dr. Welch has already said much better than I could possibly do. My own work lies not in the field of practical sanitation. I devoted my studies to the investigation of the history of medicine and most particularly of the relations of medicine to general civilization. The evolution of medicine cannot be studied separately. Medicine is a phase of the general culture of the times and has always been strongly influenced by the general *Weltanschauung*.

For a great many years I have been fascinated by the history of hygiene. I investigated its development throughout the different periods of history, and I hope to be able to publish the results of my study in a not too distant future. Today, let me give you a short review of the general ideas that led to the development of modern hygiene and more particularly of the cultural and philosophical background.

It is quite obvious that the means and methods used in the prevention of disease are those provided by medicine and science. And yet whether these methods are applied or not does not depend on medicine alone but to a much higher extent on the philosophical and social tendencies of the time. Hygiene can only be successful if the population responds to it. Sanitary measures can never be carried out by the medical man alone. They need the cooperation of the governments. A few examples will illustrate this attitude best.

We know little of the basic origins of hygiene. Empirically, guided by his instinct, man learned to distinguish what was good from what was harmful. The taste of different herbs indicated their effect to a certain extent, and so we must admit that a certain amount of hygienic knowledge was acquired empirically at a very early period. Primitive medicine has a very complex character. It has three different components: empirical, magical, and religious. Disease was attributed to the influence of magic or to malignant spirits which were thought to take possession of the diseased man, wherefore the means of protecting oneself against disease were magical and also religious. Through amulets and magical procedures people tried to counteract malignant influences.

As civilization reached a higher stage, magical beliefs that at the time had been generally accepted came to be regarded as mere superstitions; religion attained a higher plane, and here, in the cult of ancient religions, we find the most important roots of hygienic thinking. All ancient religions demanded that a man who enters the temple, who comes into the

apply their genius. Pasteur was a chemist and considered it his chief task to elucidate the secret of life by studying the structure of matter. External circumstances drove him into the field of pathology, where he made his most important contributions.

I have shocked medical audiences more than once by saying that medicine is not so much a natural as a social science. The goal of medicine is social. It is not only the cure of disease, the restoration of an organism. The goal is to keep man adjusted to his environment as a useful member of society or to readjust him as the case may be. In order to do this, medicine constantly applies methods of science, but the ultimate goal is social nevertheless. In every medical action there are always two parties involved, the physician and the patient, or, in a broader sense, the medical corps and society. Medicine is nothing else than the manifold relations between these two groups. The history of medicine, therefore, cannot limit itself to the history of the science, institutions, and characters of medicine, but must include the history of the patient in society, that of the physician, and the history of the relations between physician and patient. History thus becomes social history, and I hope to be able to show you that such an approach is promising and can contribute to a better understanding of social problems of medicine that we are facing today.

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The position of the sick man in society has changed a great deal in the course of time. There are still a few primitive tribes among which a man suffering from a serious disease is abandoned. Society is afraid of him, as it is of the dead, and flees from him so that he is dead socially before physical death has overcome him. In tribes of higher civilization the sick man is considered the victim of evil forces. Witchcraft, the action of evil spirits, or the wrath of a deity may be responsible for his illness. In the Semitic civilizations we find a different view. The patient is a victim, to be sure, but he suffers in atonement for sin. All suffering is inflicted as punishment for a sin committed by the man himself, by his parents, or by his clan. The sick man is branded with the odium of sinfulness; this ancient view survived the centuries and millennia. In the Middle Ages epidemics and other natural catastrophes were frequently considered punishments inflicted by God upon men. The days are not far remote when people believed that mental diseases were the result of a disor-

cal concept, but from religious ordinances originating in the ancient Orient.

And another institution of great hygienic significance has come to us from Judaism: the weekly day of rest. In Babylonia, the seventh, fourteenth, twenty-first, and twenty-eighth days of the month were unlucky. No work was done on such a day. The Jews adopted this institution from Babylon but gave it a more ethical significance. It became the day of the Lord, which was dedicated to rest and worship. Christianity and Islam adopted this custom, which has proved to be of great hygienic consequence.

It was the great contribution of the Greeks that they created a system of personal hygiene which set an example for all time. They did it not on account of medical considerations but through their attitude toward the human body. The Greek world was the world of the healthy and sound. Health appeared as the highest good, the ideal man was the harmonious man, who is perfectly balanced, mentally and bodily. The ideal man is healthy and beautiful. The aesthetic ideal was at the same time a hygienic ideal. Greek education tended to develop man into a harmonious being. Education, therefore, was not one-sided; it trained the body as well as the mind. From the sixth year on, the Greek boy was taken to the palestra and was taught physical exercises. At sixteen, the young man was instructed in the use of weapons in the gymnasium. We have a very interesting description of how man should live in order to be healthy, in the fragment of a fourth century doctor, Diocles of Karystos. He tells us that one should get up before sunrise, how one has to wash, to brush one's teeth. He describes the physical training. Twice a day he is to report to the gymnasium. There are only two meals a day, and the dishes recommended are *simple*.

But in Greece, also, hygiene followed religious rules. We find them especially in the school of the philosopher Pythagoras. In the sixth century B.C. he went from Samos to southern Italy and founded there a school which had more the character of a religious order. The members of that order had to lead a dignified life. They were restricted to a certain diet, which was intended to keep up their balance, to make them resistant against all disturbance from the outside world. The ideas of Pythagoras influenced Greek medicine to a large extent. They are chiefly responsible for the theory of the four humors, which were thought to constitute the substratum of life and disease. The Greeks were responsible for the development of a highly refined personal hygiene. But we must not forget

of happiness. If the state is to protect these rights as inalienable and if it is bound to promote the general welfare of the people, it seems fairly obvious that health must be a primary concern of government.

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The physician of primitive society was a physician, priest, and sorcerer all in one. He knew how to placate the deities, how to ward off witchcraft, and was experienced in the application of herbs. Shamanism was hereditary in certain tribes, while in others young people who had had an unusual infancy seemed to be predestined for their mission. It was the shaman or medicine man's function to consult the oracles in order to know the nature of a man's disease and to be able to cure it.

With developing civilization the threefold functions of the primitive medicine man were split up. At all times there were patients who sought healing not from medicine but from religion. Every civilization developed definite forms of religious medicine, healing cults. It was in ancient Greece the cult of Asklepios, in whose temples miracle cures were performed. In the Roman period his cult was so popular that other gods entered into competition with him and patients flocked to temples for healing all over the ancient world. In the early Christian church patients were treated with prayers. In the Middle Ages mental patients were believed to be possessed by evil spirits, and incantations and exorcism seemed the logical treatment. To our days, the Catholic church and Protestant sects have practiced faith healing, so that religious medicine actually survived through the ages.

The belief in magic and witchcraft has also had a long history. What was considered a legitimate science once was called a superstition later, but consciously or not people still wear amulets, still perform definite gestures to counteract the influence of evil signs. It is not so long since women were persecuted as witches.

The rational, empirical component of primitive medicine developed with growing civilization into a system of medicine which excluded the transcendental and was based on observation and reason. The Hippocratic physician was no longer a priest and anything but a sorcerer. He was a craftsman and was trained as such. He entered the services of a master as an apprentice, accompanied him to the bedside of patients, helped him in compounding drugs and performing operations, and while doing this he learned to observe the symptoms of disease, learned how to

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nomie order began to develop which called for free competition, free initiative, and appealed to the individual in man. A new political philosophy was born, that of liberalism. The traditional authorities were fought. The church, the most powerful authority of the Middle Ages, was reformed. The power of the guilds, which regulated industrial life, was broken. The authorities in the field of science and medicine, Aristotle, Galen, Avicenna, were opposed. The medical faculties fought a desperate battle to preserve their traditional power. They clung to traditions, but in vain. Since they were not open to the new science, academies were founded and became centers of research; the medical faculties' power to regulate the practice of medicine was gradually taken over by state bodies.

This new order affected the medical profession very deeply. It found itself in a competitive world in which professions were no longer divine missions but means of making a living. Again the doctors had to sell their services to whomever could purchase them as the Greek craftsmen-physicians had done, but at the same time the Christian view that everybody, whether rich or poor, was entitled to medical care was retained and even extended. Hence, a contradiction arose under which we still suffer. The medical profession for a long time refused to be dragged into the new economic order. Physicians were still eager to get salaried positions. Not only noblemen had their body-physicians but middle class families as well. They paid their family doctor an annual amount which they could afford and considered fair, and, if a doctor served a sufficient number of families, he was economically independent and could devote much of his time to serving the poor. The doctors fought heroically against the commercialization of medicine, but in a world that was ruled by iron economic necessities they had to sell their services in competition with each other in order to support their families. It is not by accident that the profession organized medical societies and established codes of ethics and etiquette during the nineteenth century. It was a last desperate attempt to protect medical practice from some of the worst aspects of competitive business.

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Let us now examine the history of the relation between physician and patient. Medicine originally was a private relationship between two persons that did not concern anyone else. Even a superficial glance at history, however, reveals a strong tendency for medicine to become a social insti-

cal concept, but from religious ordinances originating in the ancient Orient.

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out a license. Pharmacies were under strict state control. Frederick II and the school of Salerno set an example that was later followed by other European countries.

The state not only protects society by requiring a definite amount of knowledge from its physicians but also through a number of regulations that are found in the penal codes of most countries. The patient's secrets are protected by law, and the physician is made liable for his actions. He can be prosecuted if he harms his patients, which is why physicians have to carry malpractice insurance.

Society not only set standards for the physician's behavior but took over medical functions. Many medical tasks were found to be of such magnitude that they could not be carried out by individual physicians but required the state power. Early in antiquity the sanitation of dwelling places and the protection of groups against epidemic diseases became administrative functions of the state. Throughout the Middle Ages public health was an important function of municipal administrations, and with the progress of medicine the field of public health broadened considerably. Whenever private medicine was unable to solve a problem, public services had to step in. This was the case in the care of tuberculous and mental patients, of indigents in public hospitals; in recent years the fight against infant and maternal mortality and venereal diseases has become to a large extent a public function. In every country a great volume of medical work is carried out by state agencies.

The scope of medicine broadened from century to century. The physician today is the psychological adviser of the educator, and mental hygiene is beginning to play an increasingly important part. The physician is also scientific and psychological adviser to the court, without whose cooperation the administration of justice would not be possible. He has to determine the cause of death. He has to advise the judge as to the responsibility of a criminal, and psychiatrists are consulted more and more frequently in determining a sentence that will not merely punish but rehabilitate a criminal.

Economic developments greatly influenced medicine. The rise of industry from the end of the eighteenth century on created a whole set of new medical problems. The workers had to be protected against new health hazards. All civilized countries enacted workmen's compensation laws which guarantee treatment and compensation to the victim of industrial accidents and diseases, and thus force the employer to take measures in order to reduce health hazards. While industry developed,

We know a great many *regimina sanitatis*, the most containing simple rules for health, some in prose, some in verse. The best known is the regimen attributed to the school of Salérno, which was translated into a great many languages. Bath houses were erected where one could take a steam bath and where the barber-surgeon gave hygienic advice.

Most of the textbooks of surgery of the time contain a chapter bearing the title "De Decoratione," where cosmetic and hygienic matters are discussed.

With the Renaissance came a great revival of Greek ideals, a new society developed, the moral ideal of which was humanity, and this meant the highest possible development of man among his fellow creatures, the highest possible development of personality. Greek art, Greek institutions were eagerly studied, and one endeavored to live the life of the Greeks again. We should expect that such an attitude would have led to a revival of Greek hygiene, and yet that was not the case. Why? Because the educational ideal of the Renaissance, though an ancient ideal, to be sure, was not the Platonic ideal of harmonious man, but the ideal of Quintilian, the ideal of the *homo Ciceronianus*. It was a one-sided ideal, tending to develop the mental quality of man and his rhetorical abilities. And so hygienic conditions were very bad still and remained bad for centuries. The mortality, especially among children, was appalling. The plague never quite disappeared, and terrific epidemics of smallpox, diphtheria, tuberculosis, measles, typhus, and typhoid caused great devastation. In the seventeenth century the first vital statistics were made, and, imperfect as they were, they attracted public attention to the terrific death rate. People were afraid; one felt that the whole population was threatened and that something had to be done. During the eighteenth century, hygiene was greatly improved, and these improvements were due not so much to the medical as to the political conditions and to the philosophy of the time. In the absolutistic government, the monarch feels responsible for his subjects. He is to his people just what the father is to the children. He orders what is to be done in order to be healthy, and he forbids what could do harm. Health is enforced by means of the police. It is not by accident that Johann Peter Frank called his famous book *A Complete System of Medical Police*. Frank is the chief representative of this absolutist trend. His ideal is a system of policing with a book of laws which would prescribe for people what they have to do in order to be healthy from the time of their birth until their death. According to Frank, the most intimate processes in human life should be regulated by

DEVELOPMENTS AND TRENDS IN GYNECOLOGY



I SHALL not attempt in a short address to cover the history of gynecology. It would be a futile endeavor, and besides I am sure that you are all familiar with the highlights of the history of your science and art. My task will be different. Taking gynecology as my subject, I would like to make a few general historical remarks and would like to show you that there are two aspects of the history of medicine. Unless we consider them both, we shall never attain to a comprehensive picture of developments. There are actually two histories of medicine. One is the history of medical science. It teaches how man gradually discovered the structure of the human body, the function of its organs, disease mechanisms, methods to diagnose disease conditions, to evaluate them in making a prognosis, and finally methods of treatment. The more knowledge man had, the more effective his weapons became in the prevention and cure of illness. This, however, is only one side of the picture, and there is another aspect to it: the social and cultural history of medicine. Knowledge alone is not enough. It does not become effective unless we are able to apply it. Society must be ready to accept the physician's advice, and here we find that religious and philosophic views, social and economic conditions, had a tremendous influence and largely determined success or failure of medicine.

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Read by invitation at the Sixty-Sixth Annual Meeting of the American Gynecological Society, Colorado Springs, Colo., May 26 to 28, 1941.

hygienic conditions were frightful. The people felt themselves threatened again, and, when cholera invaded the world in the thirties, the general public conscience experienced a very brutal awakening. The bourgeois came to recognize that bad health conditions threatened his life also, so that in 1843 a commission was established in England to study the sanitary conditions of the country, and this led finally to the Public Health Act in 1848.

The new hygienic movement started in England. In other countries, there was much theorizing about hygiene. A great many books were written, and theoretical advice was liberally dispensed. England took the lead in practical applications, and so the question naturally arises why it was just England that became the center of hygienic endeavor in the middle of the last century. The reasons are obvious. Hygiene presupposes a definite ideal of healthy man. While on the European continent the educational ideal was a one-sided mental one, in England it was humanistic in the true sense of the word. It was the old Greek ideal of the well-balanced man mentally and bodily harmonious. Sport was an integral component of education in England, and where sport is pursued seriously important conditions for personal hygiene are obtained. Public health, on the other hand, demands a government which in itself is strong. Germany was broken up into little states, France and Italy went from one revolution to another, and England, like the Roman Empire of old, was a country existing under the best conditions.

From England the new hygienic movement spread all over the world. The great biological discoveries, so well described by Dr. Welch in his address, afforded new methods which made it possible to combat disease more and more efficiently, and all this led to the development in which we are still active, and in which your institute plays such an important part. And yet I must repeat that medicine alone will never be able to fight disease successfully. This is illustrated in a particularly graphic way by the work done in this country for the prevention of tuberculosis and venereal diseases. While the campaign against tuberculosis started at the beginning of this century has been utterly successful, the prevention of venereal diseases has been a failure so far. The reasons are easy to trace. They are not in the field of medicine, for we know the nature of both diseases well, and the treatment for syphilis is probably easier than that of tuberculosis. The reason here again lies in the cultural background. Tuberculosis is considered by the population to be a disgrace; syphilis, however, is a sin. The venereal diseases are still covered by a veil which

power at times, which explains why matriarchy was the social organization of many early tribes.

The fertility of man was rarely questioned, and even today when a family has no children the wife is suspected first, and it is difficult to convince a husband that he may be responsible for the condition.

The fact that the mystery of creation takes place in woman led to the view that the womb must be an organ of a special kind. The uterus was frequently viewed as a living organism of its own, endowed with independent motions, with desires and whims. One of our oldest medical documents, the gynecologic papyrus of Kahun written in the third millennium B.C., describes the uterus as being irritated or sluggish or wandering to places where it does not belong. All these conditions were considered to be causes of disease. The word *hysteria* that we still use means nothing else but the disease of the *hystera*, which is the Greek word for uterus. In a medieval incantation that I found in a tenth-century manuscript, the exorcising priest addresses himself to the uterus, conjuring it to remain in the place destined for it by God and not to wander through the human body causing disease. In votive offerings the womb was frequently represented as an animal, chiefly as a toad. Even in rational therapy certain procedures such as fumigations with odoriferous drugs were meant to "please" the organ.

Because sex played such an important part in woman's life, and because new life came from her, more taboos were imposed upon her than upon man. In all ancient cults woman was considered unclean during her periods, during childbirth, and in childbed. As long as she was unclean, she was not permitted to enter the temple, and her condition was considered contagious until she had undergone purification. This gave her an isolated position in society. The concept of cleanliness was purely spiritual, but it had hygienic consequences in that it protected woman against sexual intercourse during menstruation and during the period of involution. These old views, familiar to us from Leviticus, are still alive not only among Jews but in the whole Mohammedan world. I heard in Bosnia that women there are not allowed to give birth to children in the house, since this would make it impure. They go to the stables where the child is born between a cow and a goat, and infections result quite frequently.

Childbirth was considered a physiologic process and was therefore not an object of medicine. In primitive society a woman, when her hour had come, went into the bushes or to the river and came back after a while

THE SOCIAL HISTORY OF MEDICINE

I WOULD like to draw your attention to a field of studies in the history of medicine that has been greatly neglected in the past. If you open a textbook, any textbook of medical history, and try to find what health conditions were in rural France in the eighteenth century, or what disease meant to the family of an artisan at the same period, you will as a rule not find any information. We know much about the history of the great medical discoveries but very little on whether they were applied or to whom they were applied. The great achievements of the French clinic in the early nineteenth century are described in detail, but we do not hear that in the same period health conditions were atrocious among the industrial population of France. For a long time the biobibliographical approach was most popular in medical historiography, and the narrative boiled down to the history of the great doctors and of the books they wrote. The biographical approach was so popular because it has a strong human element and lends itself to dramatization. History thus appeared as the free play of men of genius who made their discoveries, being possessed by a desire to find the truth. Great interest was being shown in "firsts." Who was the first man to see a condition; who the first to perform a given operation? I have found in my studies that many great discoveries were made simultaneously by various people. Potential men of genius are present at all times. Circumstances very often determine whether they may come to the fore and to what subject they may

minate life, or that venereal diseases were the logical punishment for sexual promiscuity.

The position of the sick man was different again in Greek antiquity. The Greek world was a world of the healthy and sound. The ideal man was the harmonious being, perfectly balanced mentally and bodily. Health was considered one of the highest goods, and disease a great curse because it removed man from the condition of perfection. To attend a hopeless case was regarded as unethical since the end in view, the complete restoration of the patient, was unattainable. Weaklings and crippled children were destroyed. The sick man was an inferior being, and this too made his position particularly hard to bear.

Christianity gave the sick man a position in society that he had never had before, a preferential position. The new religion addressed itself to the poor, the oppressed, the sinners, and the sick. It addressed itself to suffering humanity and promised healing and redemption. All other ancient cults were for the clean and pure, excluding individuals that had become impure. Christianity relieved the sick man from the burden he had carried before. He was no longer considered an inferior being or one who was punished for sin. In suffering, man was carrying the cross of Christ and would be rewarded in the hereafter. It was made the duty of man to attend a sick fellow man. By joining the Christian community an individual became a member of a family, and, just as the family was responsible for the sick children, so was the Christian family for the sick brothers. When Christianity became the official religion of the Roman Empire, society as such became responsible for the care of the sick.

Since the beginning of our era, the sick man has retained his preferential position in society. To attend him in his distress was a charitable duty during the Middle Ages. It is more today. We know that if large sections of the population are sick this represents a menace to the whole of society. It is a matter of medical common sense to provide care for the indigent sick and to prevent serious illness and epidemics. More and more we have accepted the view that man has a right to health or, more correctly, a right to have all means that medical science can provide made available to him for the protection or restoration of his health. This right was justified by a German physician, S. Neumann, in 1847, who declared that the state was pledged to protect the people's property and that the only property of a poor man was his labor power, which is entirely dependent upon his health. We need not look for such a justification in a state the constitution of which guarantees life, liberty, and the pursuit

fields. A new world developed in western Europe which was very different from the static world of the Middle Ages with its rigid regulations. The new world appealed to the individual in man and called for free competition and free initiative. The attitude toward woman changed, and voices were heard calling for her liberation. The great humanist Erasmus of Rotterdam in one of his *Colloquies* has a woman say: "Men are tyrants. . . . They use us as toys. . . . They make us their laundresses and cooks and take care to exclude us from all other functions. Let them keep for themselves the tasks of government and war, but the mother should at least have a vote when it comes to establishing her children." Another humanist, Cornelius Agrippa, in a Latin *Disquisition on the Nobility and Preexcellence of the Female Sex*, published in Antwerp in 1529, went even further when he said: "Acting against all divine law, violating with impunity natural justice, the tyranny of man has deprived woman of the liberty with which she was endowed at birth. . . . As a child she is kept idle in the home. As if she were unable to attend to any higher function she is not permitted to touch anything but needle and thread." Yet she has a claim to rights. Her part in the bearing of children is much more important than that of man. She nourishes those fragile little creatures and attends to their development. And is she not just as intelligent as the other sex? She has even more insight and acuteness of spirit. Guided by an instinct which is a privilege of her nature, she often sees things more correctly than philosophers and scholars.

With this scientific and social background gynecology could not but progress. In the sixteenth century the foundation of a new descriptive, systematic human anatomy was laid. All the anatomists of the time studied the female organs. Leonardo's drawings of the child in utero were the first to break a long tradition of diagrammatic pictures that illustrated catechisms from Mustio on. Vesalius observed that the pelvic bones do not separate in childbirth. Fallopio described the tubes. Aranzio observed deformities of the pelvis.

On the basis of this new anatomy a new surgery was born, and this immediately benefited obstetrics and gynecology. In France, Ambroise Paré became not only the father of surgery but was also greatly interested in obstetrics and called himself not only a surgeon but also an *accoucheur*. He and his disciple Guillemeau practiced podalic versions, induced premature labor in cases of hemorrhage, and sutured the perineum. Cesarean section had been practiced on the dead for centuries, ever since an old Roman law had prescribed that no pregnant woman might be buried

evaluate them in order to know what fate had in store for the patient, and learned treatments and cures. When he had become a master himself, he practiced independently and did it usually as an itinerant physician. Only larger cities had permanent doctors; when a town wished to secure for itself the services of a doctor, it offered him a salary raised through taxation in order to induce him to settle down. He was allowed to charge fees for his treatments, but was guaranteed a minimum income. All smaller places, however, were served by doctors who came one morning knocking at the doors offering their services, just as other craftsmen did. If there were enough sick people in the place, the doctor rented a shop, the *iatreion*; when patients were brought to him, he examined and treated them, moving on to the next town when work gave out. If two physicians entered the same city at the same time, a wild competition resulted. In a society that did not license physicians society had no guarantee as to the knowledge of a medical man. Anybody could call himself a doctor and treat patients for fees. A physician was legitimized by his reputation. This is why so much emphasis was laid upon *doxa*, reputation, in ancient medical ethics. Reputation was the goal of the Hippocratic oath—"and if I hold this oath and break it not, may I gain reputation among all men." Like other craftsmen, the Greek physician sold his services for money. He sold them to whomever could purchase them, and those who had no money had no medical care, a condition that was generally accepted.

Things changed with the advent of Christianity. The view became general that everybody should be attended, whether rich or poor, and should have all the care that medical science was able to give. In the early Middle Ages most physicians were clerics. They were supported by the church and could practice medicine as a charitable service. Even in the later Middle Ages after many laymen had entered the profession conditions remained very much the same. Many doctors still had stipends from the church making them economically independent, others had salaried positions in the service of cities as municipal doctors, and still others were attached as body-physicians to the court of some nobleman, lay or ecclesiastical. Those who had a private practice had to follow rigid standards established by the medical faculties which acted as the physicians' guild. There was no, or very little, competition. The medieval world was a static world in which everyone was born to a definite status and where all aspects of life were regulated by authoritative bodies.

Conditions changed again in the sixteenth century when a new eco-

fields. A new world developed in western Europe which was very different from the static world of the Middle Ages with its rigid regulations. The new world appealed to the individual in man and called for free competition and free initiative. The attitude toward woman changed, and voices were heard calling for her liberation. The great humanist Erasmus of Rotterdam in one of his *Colloquies* has a woman say: "Men are tyrants. . . . They use us as toys. . . . They make us their laundresses and cooks and take care to exclude us from all other functions. Let them keep for themselves the tasks of government and war, but the mother should at least have a vote when it comes to establishing her children." Another humanist, Cornelius Agrippa, in a Latin *Disquisition on the Nobility and Preexcellence of the Female Sex*, published in Antwerp in 1529, went even further when he said: "Acting against all divine law, violating with impunity natural justice, the tyranny of man has deprived woman of the liberty with which she was endowed at birth. . . . As a child she is kept idle in the home. As if she were unable to attend to any higher function she is not permitted to touch anything but needle and thread." Yet she has a claim to rights. Her part in the bearing of children is much more important than that of man. She nourishes those fragile little creatures and attends to their development. And is she not just as intelligent as the other sex? She has even more insight and acuteness of spirit. Guided by an instinct which is a privilege of her nature, she often sees things more correctly than philosophers and scholars.

With this scientific and social background gynecology could not but progress. In the sixteenth century the foundation of a new descriptive, systematic human anatomy was laid. All the anatomists of the time studied the female organs. Leonardo's drawings of the child *in utero* were the first to break a long tradition of diagrammatic pictures that illustrated catechisms from Mustio on. Vesalius observed that the pelvic bones do not separate in childbirth. Fallopio described the tubes. Aranzio observed deformities of the pelvis.

On the basis of this new anatomy a new surgery was born, and this immediately benefited obstetrics and gynecology. In France, Ambroise Paré became not only the father of surgery but was also greatly interested in obstetrics and called himself not only a surgeon but also an *accoucheur*. He and his disciple Guillemeau practiced podalic versions, induced premature labor in cases of hemorrhage, and sutured the perineum. Cesarean section had been practiced on the dead for centuries, ever since an old Roman law had prescribed that no pregnant woman might be buried

tution. Physician and patient are both individuals, and it is under an individual agreement that they come together. But both are at the same time members of social groups, and society at an early period of history already showed interest in the physician's actions. The profession gives the doctor a great deal of power. Physical, chemical, and biological forces are placed freely into the physician's hands. He enters all homes and learns secrets that people would not divulge to anybody else. He is entitled to charge fees for a service the value of which the patient cannot estimate. Ignorance, greed, all forms of misuse of the physician's power represent a serious menace to society which, therefore, tried to protect itself by establishing standards and regulations for the physician's behavior.

As early as 2000 B.C. we find in the Code of Hammurabi a fee schedule which bases the fees on success of the treatment and social status of the patient. The Code of Hammurabi, in addition, makes the surgeon liable for his actions and punishes him very severely in case of unsuccessful treatment. The ancient Persians submitted their surgeons to strict tests. Before being allowed to practice surgery on Persians, the candidate had to have to his credit three successful operations performed on infidels. The Greeks had no state regulations concerning the practice of medicine, but the Hippocratic oath gives evidence to the fact that there were recognized standards.

In Rome, a beginning was made in licensing doctors. Julius Caesar, in order to attract Greek physicians for the armies, gave all those who were free-born Greeks Roman citizenship, and from then on physicians obtained ever-increasing privileges. Augustus knighted his body-physician. Doctors were tax exempt, free from the duty of serving in the army, of accepting lodgers, and of accepting the often very onerous public offices. Since there was no state control of medicine of any kind, people would claim to be physicians in order to enjoy the privileges. Under Antoninus Pius the number of privileged doctors was limited to five, seven, or ten according to the size of a community; in order to be granted the privileges, a doctor had to show his credentials.

An important step to protect society against the ignorance of doctors was taken in the thirteenth century in southern Italy in the empire of Frederick II. He set definite standards for medical education requiring three years of philosophy, five years of medicine, one practical year, whereupon the candidate was examined by the masters of Salerno in the presence of a state commissioner. No doctor was allowed to practice with-

France had its great century, the *Siècle de Louis XIV*, and the leading gynecologist was Mauriceau, whose textbook, first published in 1668, was used all over Europe.

Holland had at that time its great period of expansion and colonization. More than any other country it developed its waterways. Henrik van Deventer was a goldsmith who became a physician; being interested in mechanical problems, he entered the field of orthopedics. His wife was a midwife, and he became interested in the architecture and mechanics of the pelvis, a subject to which he made important contributions. It is not astonishing that this mechanical age produced the most important tool in obstetrics, the forceps. Invented by a barber surgeon, Chamberlen, it was kept a family secret, was discovered independently by Jean Palfyn, and was approved by the Paris Academy in 1723.

The education of midwives was improved. In 1630 they were given regular courses in France at the *Hôtel-Dieu*. In Germany they were instructed by the municipal surgeons. Great names appear among the midwives of the period, such as Louise Bourgeois, Marguerite du Tertre, and Justine Siegemundin. They were skilled obstetricians, and their books were widely read.

In the eighteenth century pathology became anatomic. From Vesalius on, pathologic changes had been observed in organs, and such findings were collected by Théophile Bonet in his *Sepulchretum* of 1679. It was Morgagni, however, who in 1761 laid the foundation of modern pathologic anatomy and created the method of pathologic research that was to be followed from then on. In the third volume of his *De Sedibus et Causis Morborum* he discussed pathologic changes of the female genital organs. In the following years many dissertations were written on such subjects, and the method of Morgagni was continued by Bichat and Virchow, who traced anatomic changes in the tissues and in the cells. On the basis of these studies the various gynecologic diseases could be sharply defined, and most disease entities that we recognize today were established during the nineteenth century in pursuit of this trend.

As soon as pathologic anatomy was established, a new task was set for clinical diagnostic. Its purpose became to recognize anatomic changes on the living organism with physical methods. This is why percussion and auscultation were introduced at that time and became chief methods of physical diagnostic. It was Lejumeau de Kergaradec who had the brilliant idea of applying Laënnec's auscultation to watch the heartbeat of the fetus.

medicine progressed. Many human lives can be saved today that were irrevocably lost only fifty years ago. The progress of medicine, however, increased its cost to such an extent that large sections of the population are unable to purchase the medical services they need. A paradoxical situation has developed. We have the means of wiping out a great many diseases which, however, are still among us because we are not able to apply our scientific knowledge to all the people who need treatment.

While medicine progressed as a result of the great scientific development of the nineteenth century, the structure of society underwent basic changes following the Industrial Revolution. A hundred years ago in this country—and this applies to all industrial countries—one out of five gainfully employed persons was a wage earner, while today four out of five are wage earners or salaried employees. Where the majority of people depend for an income on the labor market and can be thrown out of a job by its every fluctuation, there is by necessity a strong feeling of insecurity and, as a result, a strong demand for schemes that will guarantee the people a certain amount of social security.

The situation became acute long ago, and in the nineteenth century already ways and means were sought to bring medical care to people of low income on another than a charity basis. In Russia, as early as 1864, a complete system of state medical services financed through taxation was established in the rural districts. In Germany, compulsory health insurance was introduced in 1883 and was adopted by one European country after another, and in recent years by four American republics.

Society also became increasingly aware of the economic burden of illness. Health conditions have improved tremendously but we have the knowledge enabling us to improve them still more. We still have in every country countless cases of unnecessary illness and many premature deaths. Social planning is necessary in the medical field just as much as in other human activities.

The problem is world wide. Even this very sketchy analysis will have convinced you that conditions have changed. The society in which we live is different from that of our ancestors. The physician is no longer a medicine man nor a craftsman nor a priest. He has new tasks, new functions, and new weapons. A new medical science serving a new type of society necessarily requires new forms of medical service.

I think that the sociological approach to the history of medicine not only gives us a better understanding of the past but can also help us in planning for the future.

abuses. As a result, health conditions deteriorated, particularly among women. The population increased, especially the indigent population that lived crowded in slums, in the suburbs of cities, under atrocious hygienic conditions. We often forget that, at the time when the French clinic flourished and modern medicine was making tremendous progress, health conditions were exceedingly bad. The reports of Villermé in France, of 1840, and of Chadwick in England, of 1842, speak an eloquent language.

Industrialization had other results. Women were doing men's work. The development of industry would have been impossible without them. It was nothing but justice that they should have been entitled to share not only man's labor but also his rights, that they should have had equal opportunities of education, and that the professions should be open to them. It was felt that they should have a voice in the administration of the commonwealth. A long struggle ensued against the vested interests of men, a struggle that was not without dramatic episodes. Women won their case in most civilized countries, at least to a certain extent. Their gains are now challenged in the Fascist countries.

This whole development had some definite bearing on gynecology. Woman may have equal rights, and all occupations may be open to her. Modern society needs her labor, but nevertheless she remains woman and carries the additional burden of her sex. She creates commodities and services, but she creates, in addition, our children. She is therefore entitled to added protection. She cannot be considered free and equal as long as pregnancy means loss of a job. If she is to be truly free and equal, she must be guaranteed regular vacations on full pay and the rest she needs during pregnancy and after childbirth without loss of wages. Maternity homes, nurseries, and all other means for the protection and restoration of health must be made easily available to her.

The strain of life in an industrial society weighs heavily on the working girl and woman, and maladjustments of some kind or another make them seek the advice of a gynecologist. My colleague Sellheim in Leipzig used to say that a woman's period is like a clock. Whenever something goes wrong in that complicated mechanism, the clock immediately reveals it by being fast or slow or otherwise wrong. Gynecologic complaints drive a woman to the physician, but her ailment may not necessarily be the result of a gynecologic disease. A psychologic or social maladjustment may be responsible for it. A gynecologist who would be nothing but a surgeon would be utterly helpless in such a case.

There is another point that must be taken into consideration. Scientific research was applied to subjects that seemed important at the time. Valuations changed a great deal and were also determined by nonmedical factors. Modern pediatrics could not develop before chemistry had reached a certain level, but it could not develop either before it had been recognized that the child is more than a small-sized adult, and before the position of the child in society had changed. This likewise was the case with gynecology. The attitude of society toward woman and her position in the social structure were just as important factors in the history of gynecology as medical science. I would like to illustrate this by going with you rapidly through the various periods of history.

A determining point in the history of gynecology is to be found in the fact that sex plays a more important part in the life of woman than in that of man, and that she is more burdened by her sex. Nature has imposed menstruation upon her, the long period of pregnancy, the pains of childbirth, and the period of nursing. This explains two basic attitudes. Woman is periodically weakened by her sex life and in need of protection. She becomes dependent on somebody else, and this opens the door to exploitation. The history of exploitation of woman by man is endless. Whoever has traveled in the eastern Mediterranean countries remembers the familiar sight of a woman marching with heavy loads on her head and arms, followed by her husband and lord riding comfortably on a donkey and smoking a cigarette. Even in our own society we discriminate constantly against women, paying them lower wages than men for equal work. We discriminate against married teachers and against women students and physicians even in our own medical schools and hospitals.

On the other hand, woman by giving birth to life became an object of worship. She is fertile like the soil. It was known that seed was needed for the plant to grow, but wherever the soil was fertile vegetation was found. The mystery of creation takes place in woman as it does in nature. Nature was worshiped, and so was woman. The Great Mother was a deity found in the earliest civilizations. Neolithic statuettes have been excavated representing a woman that consists of nothing but sex, and there can be hardly any doubt that they represent a deity. In some tribes the dead were buried with their heads covered with cowry shells. The shells were the symbol of the female genital organs, of the door to life. The shell caps were meant to help the dead in coming back to life again. This function of woman as the creator of life gave her prestige, and

HISTORICAL BACKGROUND OF INDUSTRIAL AND OCCUPATIONAL DISEASES



IT is the destiny of man that he has to work to maintain his life. He has to produce and gather the food that his organism requires and has to produce goods to protect himself against the climate and to make his life easier and more enjoyable. The greatest advance in the history of human civilization was the step from the Paleolithic to the Neolithic Age, from the food-gathering to the food-producing stage, when man had learned to cultivate plants, to domesticate animals, to perfect his tools. Man struggled with nature, and he is conquering it gradually through his intelligence, inventiveness, and skill. The productive forces, animate and inanimate, active and passive, man and his raw material, the laborer and his tool, were the decisive factors in history.

Man has to work in order to live—and this is good. Work gives significance to our life. It ennobles it. It allows us to create material and spiritual values without which life would not be worth living. If society progressed, it was due to the cooperative efforts of all its members. Man has a duty to work, but he should also have a right to work.

Work balances our life and is therefore an essential factor of health. Yet we all know that man in the pursuit of his work is exposed to all kinds of hazards which threaten his life. This has always been the case no matter what the work was. The Stone Age man gathering his food, hunting animals, was subject to accidents. Neolithic bones showing traces of fractures make this evident.

with the newborn infant. If help was needed, it was given by a fellow woman who had gone through this experience herself and therefore knew about it. This still happens today all over the world. And when women began to give this aid professionally they became midwives. The institution of midwifery has played an extraordinarily important part in the history of medicine. Until a few centuries ago, the midwife was the gynecologist and obstetrician of society. She had empirically acquired knowledge and skills and in addition was the confidante of women. She, and not the physician, was consulted by women in all matters of sex.

Having been trained in Europe where the institution of midwifery is still firmly established, I have a high respect for the work of these women. I have seen them in action in mountain villages of the Caucasus and among African tribes. As long as society cannot provide a trained obstetrician for every woman, the midwife still has an important part to play, and there are conditions where she can achieve more than the physician. She has more time to spend with the woman in labor, and is frequently closer to the people, one of them, speaking their own language and familiar with their customs.

We do not know when gynecology became a part of medicine. No date can be set for it. As soon as man began to observe symptoms of disease and to reason about them, he saw that women were suffering from pains peculiar to them, from fluxes, discharges, and swellings, that their periods were irregular and that childbirth was not always a physiologic process. Egyptian papyri and Babylonian cuneiform tablets all mention gynecologic symptoms and treatments. Magic took a relatively important part in this field of medicine. Amulets were worn. No Egyptian woman would enter labor without having a statuette of the hippopotamus-shaped goddess Thokeris near by. Amulets are still worn by women in childbirth today. The old idea that in such moments people are the easy target of evil spirits still persists. From Herodotus we know that Egyptian medicine at his time was highly specialized, that there were specialists for every organ and every disease. We do not hear of specialists for the female organs, for the good reason that these organs and the diseases of women were the midwife's domain. She was the specialist.

In ancient Greece the social position of woman varied a great deal according to tribes. Among the Dorians of Sparta girls took an active part in the physical exercises of boys. They were trained to be mothers of soldiers. Conditions were different among the Ionians, where the girl grew up in the house, was veiled in the streets, and was married by her

these metals.³ The poets, Martial, Juvenal, Lucretius, reflected the views held by the layman and wrote of the dangers of certain occupations, of the diseases of sulfur workers⁴ and blacksmiths,⁵ of the varicose veins of the augurs⁶ and the hard fate of the gold miners.⁷ But nothing was done to protect the workers. They had to help themselves as the minium refiners described by Pliny did who put membranes as a mask before their faces.⁸ Medical care was given to those who served to entertain the people, the gladiators. Galen started his career by being physician to a gladiator's school in Pergamon.

The ancient physicians were not actually interested in the health of the manual laborers. They devoted their attention almost exclusively to the upper class. It is quite characteristic that Celsus believes that medicine originated with the philosophers who, having an unhealthy mode of living, naturally would be interested in correcting it.⁹ The author of the Hippocratic treatise *Peri diaites* gives special dietetic rules for such people who, having some business to attend, were not able to devote all their time and all their attention to their health.¹⁰ It would never have occurred to him to prescribe any definite hygiene to craftsmen or workers.

We must not forget, however, that ancient technology was mostly small-scale technology. The artisans frequently worked in the open air, as they still do in the Orient, so that the hazards were infinitely less than in later centuries after technology had assumed larger proportions.

Ancient civilization created great cultural values, but it was a culture that was shared by only a small upper class, and endless human lives had to be sacrificed and a great deal of suffering had to be endured to allow this culture to flourish.

Hazards occurred not only in work but also in certain recreational activities. Hippocratic surgery is mostly bone surgery and reflects the experiences the surgeons had in the gymnasiums where dislocations, fractures, and other injuries must have been quite frequent.

³ *Natural History* XXXIV, 50; XXXI, 40.

⁴ Martial, *Epigrams* X, 57, 14.

⁵ Juvenal, *Satires* X, 130.

⁶ Juvenal, *Satires* VI, 597.

⁷ Lucretius, *Vt*, 811.

⁸ Pliny, *Natural History* XXXIII, 40: "Persons employed in the manufactories in preparing minium protect the face with masks of loose bladder-skin, in order to avoid inhaling the dust, which is highly pernicious; the covering being at the same time sufficiently transparent to admit of being seen through."

⁹ Celsus, *Prohem.* 6-7.

¹⁰ *Peri diaites* I, 63; ed. Littré VI, 594.

Christianity was primarily interested in the health of the soul, and a great deal of interpretation was required to justify care of the body and to reconcile the new creed with ancient science.

The attitude toward woman was by no means favorable for the development of gynecology. Man and woman were declared equals before God, spiritually, in the hereafter, but otherwise woman was considered an inferior being. Man was made from earth, but woman from man's rib. Sin had come into the world through Eve. Her sin was responsible for the pains of love and for the pains of childbirth. A church father called woman *janua diaboli*, the door to hell.

These views also influenced the attitude toward sex. The Greeks had taken sexual intercourse for granted and had looked at it as a physiologic process that was recommended sometimes for reasons of hygiene. Christianity considered sexual intercourse sinful unless it was performed by married persons with the definite purpose of procreating children. Origenes went so far as to postulate that it should be performed dispassionately, and that even then it should not take place in a room where people pray. The soul counted, and salvation was the purpose of life. Abortion was considered murder of a particularly vicious kind, because it prevented a human being from being baptized. Faced with the alternative of saving mother or child, the physician was to sacrifice the mother without hesitation since the mother was already baptized and prepared for the hereafter, while the unbaptized child would be relegated to limbo. Contraception was even worse because it prevented the creation of a human being. Christianity set rigid taboos on sexual matters, under which the western world had to suffer for a long time.

There was woman worship in the Middle Ages too. There was a cult of Mary, but Mary was a virgin who had conceived without sin. There was a cult of woman in chivalry, but it was short-lived, had pagan elements, and was limited to a small group. Throughout the Middle Ages woman was relegated to the home and kept subservient to man.

Such conditions were not favorable for the development of gynecology, and hardly any progress was achieved during the period. Practices followed traditional lines and consisted of ancient reminiscences. Gynecology and obstetrics were in the hands of midwives. The *mulieres Salernitanæ* were midwives, specialists in the treatment of women's ailments. Literature consisted mostly of catechisms, from that of Mustio in the sixth century A.D. to the *Rosengarten* of Rösslin in 1513.

A revolution was created in the Renaissance in this as in other cultural

ten where his father had settled to practice. He lived and worked with the miners and got firsthand evidence of the appalling conditions under which they were laboring and the very serious hazards to which they were exposed.

Paracelsus' monograph is a beginning. Every writer on mining after that time never failed to touch the diseases peculiar to this industry. A very good example of this type of literature is Agricola's work, *De Re Metallica*,¹² published in 1556. In book VI he says

It remains for me to speak of the ailments and accidents of miners, and of the methods by which they can guard against these, for we should always devote more care to maintaining our health, that we may freely perform our bodily functions, than to making profits. Of the illnesses, some affect the joints, some the eyes, and finally some are fatal to men.

He then goes on describing the various hazards that threatened the miners, the abundant water often collecting in shafts making them cold and in this way injuring the workers, the dust that "has corrosive qualities and eats away the lungs, and implants consumption in the body; hence in the mines of the Carpathian Mountains women are found who have married seven husbands, all of whom this terrible consumption has carried off by a premature death." Stagnant air produces a difficulty in breathing. The remedy is to be found in the ventilating machines. Or the air is infected with poison, causing swellings and paralysis. Accidents are described as being not rare, workmen slipping from ladders in the shafts, breaking their arms, legs, or necks, or falling into the sumps and being drowned. Mountain slides occurred, as was the case in Rammelsberg where in one day "400 women were robbed of their husbands." Venomous ants were found in several mines. And finally there was one hazard that we no longer know. "In some of our mines, though in very few, there are pernicious pests. These are demons of ferocious aspect . . . ; demons of this kind are expelled and put to flight by prayer and fasting."

Special monographs on diseases of the miners were written by several German physicians, the most important being Martin Pansa,¹³ Leonardus Ursinus,¹⁴ Samuel Stockhausen,¹⁵ Suchlandius.¹⁶

¹² Georgius Agricola, *De Re Metallica*, translated from the first Latin edition of 1556 by H. C. Hoover and L. H. Hoover, London, 1912.

¹³ *Consilium Peripneumoniacum*, 1614.

¹⁴ *De Morbis Metallariorum*, Leipzig, 1652.

¹⁵ *De Lythargyri Fumo Noxio Morbico* . . . , 1656.

¹⁶ *De Paralyti Metallariorum*, Utrecht, 1693.

without having the child removed. But now the operation was practiced on the living woman, not by sow gelders as the legend had it, but by the ablest surgeons. Guillemeau describes five cases of cesarean section, two of which he performed himself in the presence of Paré, while three were performed by others. They were all fatal. The time was not yet ripe for major abdominal surgery.

Midwives were still the chief practitioners of obstetrics and gynecology, but they were pledged frequently to call the surgeon in difficult cases. Many were in the service of the cities, and their profession was regulated strictly. They were examined and had to follow fee schedules. In the sixteenth century the city of Ratisbon established old age and disability pensions for midwives.

The seventeenth century was a period of great tensions and contrasts. While Descartes inaugurated a period of rationalism, the Counter Reformation was launched, religious intolerance flourished, Campanella was tortured, and Giordano Bruno burned at the stake. At the same time, when absolutistic government prevailed in France, Spain, and a number of other countries, democracy developed in England and Holland. In France women became more and more articulate, claiming access to higher education. It was the time when Molière wrote his *Femmes Savantes* and his *Précieuses Ridicules*. The salon flourished in France, where scientists were invited to present their discoveries before an audience of men and women. It was a mechanical age. Mathematics were highly cultivated, and the names of Descartes, Pascal, Leibnitz, and Newton remind us of the great progress achieved in this field. In physics, dynamics and particularly hydrodynamics were in the foreground. Practical necessities forced scientists to take up these studies. Waterways were the chief highways of traffic. The journey from Constantinople to Venice was three times longer by land than by sea, and, while the two-wheeled oxcart could not carry more than two tons of goods, the average-sized ship transported more than 600 tons. All these trends reflected themselves in medicine and in gynecology also.

In the seventeenth century, anatomy became *anatomia animata*, dynamic anatomy. William Harvey founded a new physiology, but he was an embryologist also. Embryology is another form of dynamic anatomy. Embryologic studies greatly benefited gynecology. Van Horne declared that the female testicles contain ova. Sieno gave the ovaries their name, and de Graaf wrote a classical monograph on the female genital organs, in 1672. In 1677 the spermatozoa were seen.

House, I took notice of one of them, who worked with a great deal of Anxiety and Eagerness, and, being moved with Compassion, I asked the poor Fellow, Why he did not work more calmly and avoid over-tiring himself with too much Straining? Upon this the poor Wretch lifted up his Eyes from the dismal Vault, and replied, That none but those who have tried it could imagine the Trouble of staying above four Hours in that Place, it being equally troublesome as to be struck blind. After he came out of the Place, I took a narrow View of his Eyes, and found them very red and dim; upon which I asked him, If they had any usual Remedy for that Disorder? He replied, their only Way was to run immediately Home, and confine themselves for a Day to a dark Room, and wash their Eyes now and then with warm Water; by which Means they used to find their Pain somewhat assuaged. Then I asked him, if he felt any Heat in his Throat, and Difficulty of Respiration, or Head-ach? And whether the Smell affected their Nose, or occasioned a Squeamishness? He answered, That he felt none of those Inconveniencies; that the only Parts which suffered were the Eyes, and that if he continued longer at the same Work, without Interruption, he should be blind in a short Time, as it had happened to others. Immediately after he clapt his Hands over his Eyes, and run Home. After this I took notice of several Beggars in the City, who, having been employed in that Work, were either very weak-sighted, or absolutely blind.

He decided to study the diseases peculiar to other occupations. He went to the workshops, talked to the people, studied the conditions under which they worked.

The Shops, or Work-houses of Tradesmen are the only Schools in which we find any satisfactory Knowledge of these Matters; and out of these Places I have endeavoured to pick whatever might best please the Taste of the Curious; and chiefly indeed to suggest such Cautions, as may serve to prevent and cure the Diseases to which Tradesmen are usually subject.

He studied the literature on the subject and became more and more convinced that the occupational diseases played an important part in the life of a community.

We must own that some Arts intail no small Mischiefs upon the respective Artisans, and that the same means by which they support Life, and maintain their Families, are oftentimes the Cause of grievous Distempers, which hurry them out of the World. Now, having observed this frequently in the Course of my Practice, I bent all my Thoughts upon writing a Treatise of the Diseases of Tradesmen or Artificers.

He was aware of the fact that his subject was new and that such a first book could not be but an "imperfect performance," and yet he succeeded in covering the ground very thoroughly, describing the various trades and their hazards, indicating methods to prevent the diseases or, when they had occurred, to cure them. His therapy, of course, follows the trends of the day. He is like so many of his contemporaries in Italy, an

without having the child removed. But now the operation was practiced on the living woman, not by sow gelders as the legend had it, but by the ablest surgeons. Guillemeau describes five cases of cesarean section, two of which he performed himself in the presence of Paré, while three were performed by others. They were all fatal. The time was not yet ripe for major abdominal surgery.

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In the seventeenth century, anatomy became *anatomia animata*, dynamic anatomy. William Harvey founded a new physiology, but he was an embryologist also. Embryology is another form of dynamic anatomy. Embryologic studies greatly benefited gynecology. Van Horne declared that the female testicles contain ova. Steno gave the ovaries their name, and de Graaf wrote a classical monograph on the female genital organs, in 1672. In 1677 the spermatozoa were seen.

created different working conditions and, at the same time, new hazards. Mechanical forces of high potency were brought close to man, threatening his life. In the early nineteenth century, beginning in England, the industrial population increased tremendously and was living and working under appalling hygienic conditions. The death rate was high and the duration of life exceedingly short. Public opinion was aroused by the report of a committee of investigation in Manchester in 1795. The ruling class recognized that a sick proletariat was a menace to its own health. Another report on *The Sanitary Conditions of the Laboring Population*, published in 1838, revealed that the condition had not improved but, on the contrary, had become even worse. A very fine little book published in 1832 by a physician in Leeds, C. Turner Thackrah, on *The Effects of Arts, Trades, and Professions, and of Civic States and Habits of Living, on Health and Longevity*, revealed striking figures. In the industrial city of Leeds in 1821 there was one death per 55 inhabitants, while in a neighboring rural district there was one death per 74 inhabitants. "At least 450 persons therefore die annually in the borough of Leeds from the injurious effects of manufactories, the crowded state of population and the consequences of bad habits of life," was the conclusion of Thackrah who then proceeds,

Every day we see sacrificed to the artificial state of society one and sometimes two victims, whom the destinies of nature would have spared. The destruction of 450 persons year by year in the borough of Leeds cannot be considered by any benevolent mind as an insignificant affair. Still less can the impaired health, the lingering ailments, the premature decay, mental and corporeal, of nine-tenths of the survivors, be a subject of indifference. Nor is it in Leeds only that inquiry produces so painful a result. Leaving out of the question London and the Seaports, we might prove that Sheffield, Manchester, Birmingham, in fact, all our great manufacturing towns, exhibit an equal or a greater excess of mortality,—and an excess increasing with the magnitude of the population. If we should suppose that 50,000 persons die annually in Great Britain from the effects of manufacturers, civic states, and the intemperance connected with these states and occupations, our estimate I am convinced would be considerably below the truth. Can we view with apathy such a superfluous mortality, such a waste of human life? Assuredly an examination of our civic states and employments has long been demanded, alike by humanity and by science.

Thackrah wrote his courageous book "to excite the public attention to the subject." He was well aware that the upper class did not like to have this subject discussed, but he was convinced that conditions could be, and must be, improved.

Most persons, who reflect on the subject, will be inclined to admit that our em-

The eighteenth century was an international century. Every country made its contribution to gynecology. In England William Smellie and William Hunter produced their superb atlases of the pregnant uterus. Special lying-in hospitals were erected in every country. They not only improved the conditions of women in childbirth, but improved also the educational facilities for midwives.

In the nineteenth century therapy became anatomic, and this explains the tremendous development of surgery. General anesthesia, antisepsis, and asepsis broke the age-old bonds that had impeded the progress of surgery. Anesthesia and asepsis were found because medicine had reached the point at which surgery was no longer the *ultimum refugium* to which resort was taken when all other methods had failed, but had become a primary goal. Surgery revolutionized gynecology and obstetrics. Major abdominal operations could be performed now. Large tumors could be removed without danger to the patient, and cesarean section was no longer an act of desperation. The development of surgery also created a new type of hospital, and the number of deliveries that took place in hospitals increased considerably. In this great development American surgeons have played a very important part, and I need only remind you of the names of Ephraim McDowell and James Marion Sims.

Today a cycle has come to an end. The anatomic approach inaugurated in the Renaissance has been applied to one medical field after another, and today we are in a physiologic era. Physiology is in the foreground of all considerations. We no longer operate for a retroflexion merely because the uterus does not hold the position prescribed for it by the textbooks. Function is being considered first of all. New physiologic discoveries, particularly that of hormones and vitamins, have stimulated both gynecology and obstetrics.

I cannot discuss the recent developments, and I need not do it because the gynecology that you practice today represents the experience of the last fifty years. I would like to draw your attention, however, to the social history of the period, an aspect that has been frequently underestimated.

The Industrial Revolution was the event that had the most profound influence on the entire nineteenth century and on our days too. Industrialization created employment not only for men but also for women and children. Women entered the process of production in increasing numbers. The textile industries were built up almost entirely with woman labor, but women worked also in mines underground and in other industries until factory legislation stopped some of the worst

that the army would soon be deprived of recruits. The North German Union in 1869 in its industrial code stated that "every manufacturer must at its own cost establish all necessary appliances for safeguarding its employees against dangers to health and life." Social insurance was inaugurated in Germany in 1883, and, as it included accidents and diseases, provisions were made to give medical service to the working population.

In the United States the literature on occupational diseases began in 1837 with a dissertation, *On the Influence of Trades, Professions and Occupations*, written at the instigation of the New York Medical Society.²⁰ Factory legislation followed from the middle of the century on and developed rather slowly.

It is not until the twentieth century that there was a real improvement in working conditions. The World War [I] proved to be a strong stimulus. Workers were scarce. Their health, therefore, meant a great deal. Research was done; chairs for industrial hygiene were established in quite a few universities; industrial clinics were opened, the first in 1910 in New York and Milan; museums were established in various countries showing the sources of industrial hazards and the way to prevent them. The most important improvements were due to legislative acts, their principles being the same in all countries: medical inspection of industrial undertakings, compulsory reporting of industrial diseases and compensation of the diseased and disabled workers. In 1906, revising the Workman's Compensation Act of 1897, England included thirty-one industrial diseases. This act had a great influence upon the United States.

It is obvious that the Soviet Union would pay great attention to industrial diseases and accidents. Research institutes have been created all over the Union, and the health of the working population is being improved not only through measures of industrial hygiene but also through the reduction of working hours, the organization of rest and recreation, and a system of socialized medicine that makes medical care available to all.

There can be no doubt that the working conditions have greatly improved in almost all civilized countries, and yet you know as well as I that what has been achieved so far is just a beginning. In a highly industrialized society where the machine is no longer restricted to the workshop but has invaded the streets, the hazards will always be great. To reduce them to a minimum is only possible through the cooperative efforts of physician, engineer, statesman, and educator.

²⁰ *Occupation and Health*, vol. II, Geneva, International Labour Office, 1934, p. 381.

Gynecology, as the word indicates, is the science of woman in health and disease, of her physiologic and pathologic processes and of all problems peculiar to her. This requires that the gynecologist be not only a scientist but also have a broad psychologic and social approach to his problems.

I have shown you that the gynecologist had two ancestors. The surgeon was his father, the midwife his mother. From the father he inherited techniques, knowledge, and skills; from the mother he received in addition the human touch. Like the midwife of old, he must be the confidant of women who consult him whenever they are in trouble, whether their ailments are organic or not.

In gynecology and obstetrics, as in every other field of medicine, the urgent problem of our day is to make whatever knowledge we have available to all who need it. Great progress has been achieved, and many human lives are being saved that would have been lost irrevocably only yesterday. But we all know that conditions could be better than they are. In spite of all progress, with all the knowledge and equipment we possess, we still lose in this country annually about 9000 young mothers from the results of pregnancy and childbirth, and we lose many of them needlessly. Every year more than 180,000 young women go through the trying period of pregnancy and childbirth, and the result is a dead child or one that will die during his first year of life. Our task is not yet solved. Science and technology developed more than ever before. As a result medicine progressed, the structure of society changed, and so did the position of women in it. Conditions are totally different today from what they were one hundred or only fifty years ago. It is obvious that adjustments must be made.

You as individuals and as a group are leaders in your field. Through your researches you have advanced the science of gynecology considerably. Your society was founded in 1876 and when you look back you can be justly proud of your achievements, but you must remember that since 1876 the world has changed a great deal. New social problems have become very acute, and I am sure that in this field also the country is looking to you for leadership.

instinct, men tried out all kinds of drugs, all kinds of dietetic treatments, in order to cure the disease. A vast knowledge was acquired in this way. And in many cases drugs were discovered that we still use today. Therapy, however, was not always merely empirical. In many instances it was directed by theoretical consideration. Even in former times we find a strong need for causality. The origin of disease and its mechanism had to be explained. The facts observed, the clinical features, were so numerous that a theory proved necessary in order to understand the facts and to master them.

This point leads to a third approach in studying the history of a disease. After we know when and where the disease occurred and what was done to fight it, we want to know what the doctor thought of the disease—what views he had on the nature of that particular disease.

The history of pathology has to deal with different groups of diseases. There are diseases that are extinct today, as for instance the "sweating sickness." In such a case we study a purely historical phenomenon. We have no observations of our own—we have to rely on observations made by other people and transmitted to us in literature. Now there is another group of diseases, the clinical features of which were very well known centuries ago, of which, however, the cause and the pathological mechanism were discovered only in recent times. This is the case for most contagious diseases. When we study the history of these, our superior knowledge helps us a great deal in tracing them through medical literature. The history of such diseases has come to a certain close. They still exist, but we know them and we know how to fight them. It appears to me that in the history of all diseases we can distinguish three different phases. The first might be called the empirical and speculative phase. The disease is known in many of its clinical features, and it is treated by empirical means with more or less success. Then comes a second stage when the cause and mechanism of the disease are discovered, and finally we have the third and last stage when on account of that knowledge the disease can be combatted more successfully. In the history of tuberculosis, for example, we have reached this last phase. Through the discoveries of Koch and many others, we have a thorough knowledge of the disease, and I have no doubt that we will get rid of tuberculosis some day, as it is much less a medical than a social and economic problem.

Finally, we have a last group of diseases, the true nature of which is still unknown and for which we still have no satisfactory cure. And this is the case with cancer. The medical historian, in tracing the history of

With developing civilization production increased. New occupations created new hazards. The working conditions of a definite period and country represent an important criterion of a given civilization. When we look at the history of civilization from this point of view, we certainly have no reason to be proud of our past.

We are inclined to value a civilization according to its artistic achievements. We admire the pyramids and the temples of ancient Egypt which have survived the centuries and millenniums, but we forget that they were built with the blood and tears of thousands of human beings. Labor in ancient civilization was primarily slave labor. The pyramids were built by state slaves whose lives had no value whatever, whom every war would replace. We still can see the Egyptian workers laboring under the whip as represented on wall paintings and in reliefs. The lot of the city workers was hardly any better, and we can still perceive their voice of rebellion. Egyptian literature has preserved, besides a huge mass of religious texts written in praise of the gods, a few scraps which tell us of the hard life of the people.

I have never seen a blacksmith acting as ambassador or a foundry worker sent on a mission, but what I have seen is the metal worker at his work: he is grilled at the mouth of the furnace. The mason, exposed to all weathers and all risks, builds without clothing. His arms are worn out with work, his food is mixed up with dirt and rubbish: he bites his nails, for he has no other food. The barber breaks his arm to fill his stomach. The weaver engaged in home work is worse off in the house than the women: doubled up with his knees drawn up to his stomach, he cannot breathe. The laundryman on the quays is the neighbour of crocodiles. The dyeworker stinks of fish spawn: his eyes are tired, his hand works unceasingly and as he spends his time in cutting up rags he has a horror of clothing.¹

We admire the graceful Greek bronze statuettes that fill our museums, but we do not think of the copper miners providing material for these works of art, or the coal miners digging for coal to make the bronze, working ten hours in narrow galleries suffocated by heat and smoke. They were prisoners of war or convicts as a rule.

The ancient physicians, keen observers as they were, noticed the influence of certain occupations on the worker's health. A good deal of information is scattered all over the Greek and Roman literature. A case of lead poisoning was correctly described by Hippocrates.² Pliny speaks of the noxious influence of lead, mercury, and sulfur on those who handled

¹ Papyrus Sallier, 2, 4, 6, and following.

² *Epidemics* VI, 25; ed. Littré V, 164-166.

work of Bichat, Schwann, Johannes Müller, Virchow, and others. Even today the diagnosis might be difficult in many cases, and we know how often we are obliged to make an excision in order to make up the diagnosis microscopically.

We must try to realize the situation in which the ancient physicians were. What did they see? They saw a swelling on the surface of the body—a swelling that grew, and occasionally ulcerated. They observed that there were such swellings that had an inflammatory nature. They were red, hot, painful, and the patient was feverish. They observed further that such swellings might turn into pus. But then they saw swellings with entirely different characteristics. These too grew, but they grew much more slowly. Some of them felt soft, just as does the fatty part of the body, and proved to be harmless so far. Others, however, were very malignant, and Hippocrates called these *karkinos*, or *karkinoma*; when they felt particularly hard he called them *skirros*. There was no cure for such a disease.

As long as one did not practice dissection of cadavers, the superficial tumors only were observed. And it was chiefly cancer of the breast that attracted the physicians' attention. Its crablike appearance was responsible for its name, according to Galen. But by and by tumors were seen in hidden places also, as for instance on the cervix uteri and in the anus. Sometimes tumors were felt in the abdominal cavity, and by analogy it was assumed that these must be tumors similar to those observed on the surface.

So one result of the historical investigation is that cancer, malignant tumors at large, represents a disease general to mankind. It is not restricted to any country, race, or period, but is a disease of the adult individual, just as are the diseases of the circulatory apparatus.

To trace the history of cancer in ancient literature is very difficult, chiefly because the nomenclature is confused. The same word signifies different diseases in different authors. We must never forget that Greek medicine had a history of a thousand years, and that the conceptions we find in the Hippocratic writings were modified to a very large extent by the subsequent developments. Another reason why the identity of a disease described in antiquity is difficult to ascertain is that most Greek schools had a conception of disease very different from ours. They did not consider and describe diseases as a morbid entity, but described them as merely symptoms or groups of symptoms. It will be the task of investigators to examine the whole Greek literature very carefully in order to find

The Middle Ages scarcely made any contributions to the subject, and it is not before the end of the fifteenth century that we begin to find a special literature devoted to occupational diseases.

Why then? For various reasons. Medicine had progressed, and the physicians were keenly interested in describing new diseases. But there are other, economic, reasons. The volume of trade had increased considerably, which created a great demand for metals, particularly gold and silver for currency as a medium of exchange. The voyages of discovery were undertaken not so much in the interest of science as primarily in search of precious metals. Besides, firearms were used more and more frequently, which created a strong demand for iron, copper, and lead. The shallow mineral deposits were exhausted and it was necessary to dig deeper, which obviously created increased hazards. At the same time, in many countries the farmers were evicted, were divorced from the means of production, and became proletarians who had nothing to sell but their labor powers. Many of them went into industry.

The *morbi metallici* were the first occupational diseases to attract the attention of medical writers. In 1473 a German physician in Augsburg, Ulrich Ellenbog, wrote a little pamphlet of seven small printed pages, *Von den giftigen besen Tempffen und Reuchen* (*On the Poisonous Wicked Fumes and Smokes*). Augsburg at that time was famous for its goldsmiths. Ellenbog, who apparently had such goldsmiths among his patients, noticed that some of their troubles were probably due to their working conditions. He wrote his pamphlet as a memorandum describing the dangers of fumes that developed from coal, nitric acid, lead, mercury, and other metals. He advised the goldsmiths to work, whenever possible, in the open air, to cover their mouths when the fumes developed, and, in the style of the time, recommended a number of drugs to be smelled as a measure of protection. Ellenbog's memorandum circulated in manuscript copies in the workshops and was printed in about 1524. It must have been very popular because only one copy of the printed pamphlet is known to exist. It was, however, reproduced in facsimile in 1927.¹¹

Ellenbog's was just a short memorandum. The first monograph devoted to occupational diseases is due to Paracelsus, who, greatly interested in chemistry, visited many mines, particularly those of Villach in Kärn-

¹¹ Ulrich Ellenbog, *Von den giftigen besen Tempffen und Reuchen*, Eine gewerbehygienische Schrift des XV. Jahrhunderts, herausgegeben von Franz Koelsch und Friedrich Zoepfl, Munich, 1927.

later another great surgeon, Lanfranchi, makes the very reasonable statement that cancer must not be touched if it grows in parts of the body that are "nervis, venis, et arteriis intricatis." They all agreed that only radical operations on an early growth would have any success, but radical operations at that time without satisfactory anesthesia, and without the means of preventing infection, were hardly possible. Whether a cancer was operated or not depended chiefly on the temperament of the surgeon, the results in both cases being nearly the same, with very few exceptions.

The history of the therapy of cancer is very dull. The principles we are following today, namely, the elimination of the tumor as radically as possible, were discovered in far remote antiquity. Our operative methods are much more efficient than theirs were, and besides the knife we have X-rays and radium to destroy the tumor cells, but we have not found any new principle yet.

And now to the problem, what did the physicians think of cancer? How did they explain the phenomenon of swelling? It is obvious that the theories of cancer were in accordance with the general pathological conceptions of the different periods. If I were to trace the history of the cancer theories in detail, I would have to trace the whole history of pathology. So all I can do is to point out some of the most important theories. Greek medicine distinguished three different kinds of growths. One, *secundum naturam*, was the physiological growth, the growth of the developing organism, the growth observed in the pregnant uterus, or in the physiological swelling of the breasts. Another was the growth *supra naturam*, a growth pathological only in its quantity, as happens for instance when a callus is formed after a fracture. And finally there is a growth *praeter naturam*, an abnormal pathological growth—the growth of the tumor.

According to the physiological theories of Galen, who developed and systematized the Hippocratic views, there were four "humors" in the human body: blood, phlegm, black and yellow bile. If they were well balanced, man was healthy. A disturbance of this balance meant disease. The theory of the four humors was not bad at all. It explained a great many facts, and as a working hypothesis gave quite good results. In the case of tumors, obviously there, too, the balance had been upset. Which humor was responsible for it? Galen thought that it was the black bile. Why? It seemed to him that people in whom the black bile dominated physiologically were disposed to tumors. It was believed that the black bile became thickened, and that in this way the tumor originated.

The Greek pathologists knew that in the human body there is a natural

There is no doubt that mining was the most dangerous of all occupations and therefore was given attention first. In the seventeenth century, books began to be written on the diseases of other occupational groups. They concern less the working class than the upper class, the courtiers, the scholars, men of letters in general, but then also soldiers and sailors because the fighting strength of an army or navy was determined to quite an extent by the health conditions.

A great many scattered observations on occupational diseases are found in the medical literature of the seventeenth century. The century of Sydenham was naturally interested in disease entities and endeavored to describe their clinical picture accurately. But the seventeenth century was also the century of the iatromechanists, who attempted to explain the functions of the human body mechanically, who liked to compare the organs to tools and therefore were interested in tools and machines.

And then in 1700 the Italian physician Bernardino Ramazzini published his famous book *De Morbis Artificum Diatriba*, of which an English translation appeared in 1705 under the title: *A Treatise of the Diseases of Tradesmen, Shewing the Various Influence of Particular Trades upon the State of Health; with the Best Methods to Avoid or Correct It, and Useful Hints Proper to Be Minded in Regulating the Cure of All Diseases Incident to Tradesmen*¹⁷—the first textbook on occupational diseases. I have just reread it. It is a fine book, a real medical classic. It is to the history of occupational diseases what Vesalius' book is to anatomy, Harvey's to physiology, Morgagni's to pathology. It would be worth while reprinting the complete English translation of the book as it is not only interesting from the medical point of view but gives a very good account of the working conditions of the time.¹⁸

Ramazzini was a distinguished physician in Modena, professor at the University of this city, and in 1700, the year his book was published, he was called to the University of Padua. Discussing the diseases of "Cleansers of Jakes" (chapter XIV), he tells us how he became interested in his subject.

The Accident, from which I took occasion to write this Treatise of the Diseases of Tradesmen is as follows. In this City, which is very populous for its Bigness, and is built both close and high, it is usual to have their Houses of Office cleansed every third Year; and, while the Men employed in this Work were cleansing that at my

¹⁷ Further English editions were published 1746 and 1750.

¹⁸ Abstracts have been reprinted by Herman Goodman, New York, 1933. The original Latin text was reprinted with an introduction by F. C. Mayer (now at the Army Medical Library in Washington), in Budapest, 1928.

ciate the more we study his works. He, too, believed in the theory of the coagulated lymph. But his conceptions are not the naive mechanical ones of the past century. They are entirely biological. Cancer to him is a part of the body comparable to an organ. It is nourished by the vessels of the organism. And therefore he tried to isolate the tumor by compressing the blood vessels leading to it, or by making ligatures.

The lymph theory, however, was not satisfactory either. Doubts were expressed, chiefly by Morgagni. In his dissections he found a great many tumors, and was convinced that they were more than the result of the coagulation of the lymph. And yet he could not find any better explanation. In 1773 the Academy of Lyons offered a prize for the best answer to the question "What is cancer?" A young man by the name of Bernard Peyrille got the prize for a thesis that gives a very good summary of the knowledge of the time. "There must be special cancer virus," he said, "that is responsible for the alteration of the lymph." He tried to make experiments. He injected cancer material, taken from a cancer of the breast, into a dog. Unfortunately, the experiment did not come to an end. The dog barked so terribly that it was killed by the doctor's landlady.

In 1802 a society for investigating the nature and cure of cancer was founded in England. It issued a questionnaire that was sent to all prominent physicians, the questions of which could not be more sensible. "What are the diagnostic symptoms of cancer?" "What is the nature of cancer, principally its pathological anatomy?" "Is cancer a primary disease or can cancer develop out of other diseases?" "Is cancer hereditary?" etc. . . . Unfortunately the society was disbanded four years later without obtaining any significant results.

It was too advanced for the times. In 1802, the year that this committee was appointed, a man died in Paris who opened new horizons for pathological research, Xavier Bichat. His ways had to be followed in studying the problem of cancer, and this meant investigation of the tumors by the new methods of pathological anatomy. The French school followed Bichat's path and did some creditable work on the subject. Laënnec was the first to differentiate between homeoplastic and heteroplastic tumors. While scirrhus was often regarded as a precancerous condition, he described it as a tumor of its own, as a growth of the connective tissues.^{*} Then the cell theory was established, and Johannes Müller applied it to

^{*} See Fielding H. Garrison's excellent editorial on the history of cancer in this bulletin [*Bulletin of The New York Academy of Medicine* (ser. 2) 2(4):179-185, 1926].

iatromechanist. But the book is full of common sense and inaugurates a new period in the history of the subject.

One other great contribution was derived from it. From then on, when interrogating a patient, the physician would ask what his occupation was. Ramazzini mentions the necessity of doing this.

When a Physician therefore is called to visit one of the poorer and meaner sort of People, I would advise him not to feel the Pulse as soon as he comes into a Room, without inquiring into the Circumstances of the Patient, nor to stand, as it were, in a transient Posture, to prescribe where the Life of Man is concerned; but to sit down by the Patient, let the Place be never so sorry, and carefully interrogate him upon such Things, as both the Precepts of our Art, and the Offices of Humanity require us to know. The Divine Hippocrates informs us, that when a Physician visits a Patient, he ought to inquire into many things, by putting Questions to the Patient and Bystanders. . . . To which I would presume to add one Interrogation more; namely, what Trade he is of. For though this Question may be referred to the morbid Causes, yet I reckon it very convenient, and absolutely necessary, when we have to do with the vulgar ordinary Patients: But I find it very seldom minded in the common Course of Practice, or if the Physician knows it without asking he takes but little notice of it: Though at the same Time a just Regard to that, would be of great Service in facilitating the Cure.

Morgagni in his great book *De Sedibus et Causis Morborum*, published in 1761, mentioned the former occupation of almost all of the cases he described.

Ramazzini gave the medical world a textbook outlining a new subject. His distinction of two great groups of occupational diseases, one due to the material and one due to the labor involved, was very good indeed and was accepted by most physicians who in the following years wrote on the subject. Ramazzini's book was a mine of information often consulted during the eighteenth and early nineteenth centuries. As a matter of fact the eighteenth century had very little to add to what Ramazzini had said. Hecquet's *La Médecine, la Chirurgie, et la Pharmacie des Pauvres*, published in 1740, contains mere abstracts from Ramazzini, and the two most popular medical dictionaries in which occupational diseases were described took their material from Hecquet.¹⁹ The physicians knew how to prevent many such accidents, and yet hardly anything was done to protect the workers during the eighteenth century. They had to protect themselves as well as they could. At the same time, however, the industrialization of Europe progressed faster than ever before. The steam engine introduced in the textile and mining industry accelerated the development,

¹⁹ *Dictionnaire de Santé*, Paris, 1760; *Dictionnaire de Médecine*, Paris, 1772.

AMERICAN SPAS IN HISTORICAL PERSPECTIVE

THE European physician who comes to America it is very striking to find what little use this country is making of its mineral springs. The situation is so totally different from that which prevails in Europe that it calls for an analysis.

Mineral springs attracted the attention of people very early on account of the temperature, color, taste, or smell of their water. Instinctively, people suffering from various ailments made use of them by bathing in them or drinking. Once they found relief from their sufferings, a tradition was soon established. Wherever Roman legions set foot they made extensive use of the medicinal springs they found, and Roman objects have been excavated in many European spas.¹ In the troubled centuries of the early Middle Ages the existence of many springs was forgotten, but they were rediscovered in the later Middle Ages and in the Renaissance.²

Read before the Johns Hopkins Medical History Club on November 3, 1941.

¹ The European literature on the history of balneology is very rich. For general surveys see Alfred Martin, *Deutsches Badewesen in vergangenen Tagen*, Jena, 1906; von Oefele, "Geschichte der Balneologie und der Grenzgebiete in der Neuzeit," in *Handbuch der Geschichte der Medizin*, herausgegeben von Max Neuburger und Julius Pagel, Jena, 1903, vol. 2, pp. 389-603; Bernhard Maximilian Lersch, *Geschichte der Balneologie, Hydroponie und Pegologie*, etc., Würzburg, 1863.

² A. C. Klebs, "Balneology in the Middle Ages," *Transactions of the American Climatological and Clinical Association* 32:15-37, 1916.

ployments are in a considerable degree injurious to health, but they believe, or profess to believe, that the evils cannot be counteracted, and urge that an investigation of such evils can produce only pain and discontent. From a reference to fact and observation I reply, that in many of our occupations, the injurious agents might be immediately removed or diminished. Evils are suffered to exist, even where the means of correction are known and easily applied. Thoughtlessness or apathy is the only obstacle to success. But even where no adequate remedy immediately presents itself, observation and discussion will rarely fail to find one. We might even say, that the human mind cannot be fairly and perseveringly applied to a subject of this kind, without decided effect.

The work of the physicians was important, but it was obvious that conditions could only be improved by way of legislation. The first Factory Act, The Health and Morals Apprentices' Act, was passed in 1802 and was followed in the ensuing years by other acts removing some of the worst abuses, particularly in the exploitation of women and children. In spite of them conditions were still bad enough.

In France it was the report of the Prefect of Police, Dubois, of 1807 that revealed the terrifying health conditions of the industrial population. The physicians were not idle in France either. In 1822 Ph. Patissier published a French translation of Ramazzini to which he added his own observations. He recognized that, as a foundation for further research, statistics should be made of the death rate in the various occupations. He made such statistics himself for the year 1807 based on the deaths that occurred in the Paris hospitals. The relationship between death rate and wages was clearly seen by Villermé, who, later, in 1840 published very interesting statistics. What should be done? Patissier suggested the following. First, dangerous trades should be entirely forbidden or, if this proves impossible, only criminals sentenced to death and pardoned to hard labor should be allowed to work in such trades. Second, research should be done so as to improve the working conditions by applying measures of industrial hygiene. Third, the states should have public baths easily available to the workers. Fourth, workers injured through their labor should be compensated and should have old-age insurance. There were 120 Sociétés de Prévoyance, including 40,000 workers, in France in 1822. They were mutual benefit societies organized by the Société Philanthropique.

Germany was industrialized much later than England or France, and it is characteristic that it was the report of a recruiting officer that drew the attention of the public to the health conditions in the working population. Traveling in the Rhine region, he found the health conditions such

based on anatomy and the other natural sciences developed. But whatever the theories were, patients for over 2000 years went to the spas, bathed in their waters, drank them, and found relief. Every medical theory was used to explain the effect of medicinal waters. The explanations changed, but there were always results. In every century patients were benefited by their cures.

Today, research institutes have been established in various European spas and the effect of the waters is studied in clinics and laboratories. Medical students are instructed in the use of the waters. When I was a student at the University of Zurich we were given theoretical instruction in the course on experimental pharmacology. The indications for treatment in watering places were discussed in all clinics, and once every year all clinical students went for a visit to one of the famous spas of the country. There we were given lectures and clinical demonstrations by the local health authorities and physicians, and we had an opportunity to study the facilities of the place. Thus in the course of six years we came to see the various types of spas and learned what they could achieve.

Many European spas are owned and administered by the communities or by the state, but even in such a case they are usually operated on a commercial basis. They are eager to attract visitors, and their advertising is not always strictly scientific. Commercial and medical interests frequently clash. A new development took place in the Soviet Union where all health resorts with all their facilities are owned by public institutions and operated as a public service.⁸ They are administered by the health authorities, so that there cannot be any commercial interference of any kind. Russia has developed the science of health resorts more than any other country. A central research institute in Moscow with laboratories and a clinical division directs activities and serves as a clearinghouse. Local research institutes have been established in a number of cities and in all the important health resorts. Today already more than a million patients are treated every year in spas, usually at the expense of the social insurance funds or the trade unions. The development of health resorts has been one of the most brilliant achievements of Soviet medicine, and there is no doubt that the program will be continued in increased measure after the war.

When we turn to the United States the picture is very different. The country is very rich in medicinal springs, particularly in the region of

⁸ See H. E. Sigerist, *Socialized Medicine in the Soviet Union*, New York, 1937, pp. 181-189.

THE HISTORICAL DEVELOPMENT OF THE PATHOLOGY AND THERAPY OF CANCER

WHEN we study the history of a disease, we can and we have to approach the subject from entirely different angles. The first question we have to answer will be about the occurrence of the disease. We want to know how old the disease is, how far back it can be traced in history, when it was first observed, and when it was first described. At the same time, we want to know where the disease occurred, whether it was a widespread disease, or whether it was distributed in certain definite countries. And, finally, we want to know whether the disease had the same characteristics in ancient times as it has today, or whether it changed its character, as has happened in many cases. In order to solve such a problem, we have to investigate all the available literature, medical or non-medical, and, whenever possible, we will study the human remains, the bones, and the soft tissues of Egyptian mummies.

After we have ascertained the occurrence of the disease, the next problem that interests us is to know how the disease was treated by the physicians in different times, what the doctor did in order to cure the disease, and eventually to prevent it, and what results were obtained by definite treatments. Therapy in early times was chiefly empirical. Guided by

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Delivered before The New York Academy of Medicine, October 20, 1932.

using the waters in succession. Such a tour was a social affair since every spa provided a variety of entertainment. The Philadelphia physician John Bell, one of the pioneers of American balneology, in his book *On Baths and Mineral Waters*, published in Philadelphia in 1831, is full of praise for the Virginia springs and says:

All that has been performed by the Bristol, Buxton and Bath waters of England, may be safely claimed as of easy fulfilment by the use of the Virginia waters just enumerated. If to these springs—the *Sweet*, the *Warm* and the *Hot*, be added the *White Sulphur*, the *Salt Sulphur* and the *Red Sulphur*, we can safely challenge any district of country of the same extent in the world, as that in which these springs are situated, to produce the same number and variety, whether we have regard to mineral impregnation or temperature; or the use of which shall be attended with more speedy, entire, and permanent relief from a host of the most distressing maladies.

John Bell, however, is well aware not only of the curative forces of the Virginia springs but also of the beauty of the landscape.

In addition to the inducements presented to invalids and the inhabitants of our northern and eastern cities by the springs themselves, there are all the pleasures to be derived from scenery of the most varied and picturesque character—natural objects without number, calculated, some to inspire with sentiments of the sublime at their size, grandeur and wild appearance, others to fill the breast with tranquil emotions at the sight of the softened beauties of the landscape spread out before them.

Other famous spas were developed in the early nineteenth century, first of all Saratoga in the state of New York. The water of Saratoga had long been known to the Mohawk Indians, who used it in the treatment of various diseases. They brought white people to the spring. George Washington came in 1783, was interested, and even thought of purchasing the High Rock Spring.⁸ The history of Saratoga as a health resort began when Gideon Putnam built the first tavern in 1803 and laid out the village two years later. From 1806 on, the sulfur waters of Clifton Springs, N. Y., were used, and Dr. Henry Foster built a sanatorium there in 1850. In Pennsylvania the Bedford Springs were discovered in 1804, and the place became a very fashionable resort. The Arkansas Hot Springs were made a national reservation in 1832 and thus remained the property of the federal government, which established a number of bath-houses from 1878 on. In the Middle West, French Lick, Ind., was developed as a spa from 1810.

⁸ Hugh Bradley, *Such Was Saratoga*, New York, 1940.

cancer, has a very unsatisfactory task. I cannot tell you of high spots in the history of cancer, of periods of great discoveries, of waves of enthusiasm, as were observed when Koch discovered the tubercle bacillus, or Schaudinn the spirochete, or when Ehrlich brought out his salvarsan. The history of cancer is a dry history of errors and of many disappointments. The history of cancer is still in its primitive stage. The disease is still among us, threatening human society more than ever, and the fact particularly bewildering is that we are facing a biological problem that doesn't fit into our general biological conceptions. However, even in such a case, a historical survey might prove of some interest. There might be some enlightenment, even in the history of errors. And after all is there not heroism in the lost battle also?

First of all, it certainly is important to ascertain that in all probability malignant tumors occurred at all times and everywhere. Whenever we find medical documents, the Egyptian papyri as well as the cuneiform tablets of Babylonia or the manuscripts of old India, we find descriptions relating to malignant tumors. And, what is more important, we have bones of early historical man, showing evidence of such tumors.

In the medical literature of the ancient Orient, references to malignant tumors are scarce. And yet there is one very important passage in the Papyrus Ebers, a papyrus written in the fifteenth century B.C., where a tumor is mentioned, and where it is said that such a tumor must not be touched, meaning that in such a case treatment might prove fatal.¹ It is obvious that we have no statistical data as to frequency of tumors in antiquity. Such diseases, however, were certainly not rare—they must have occurred rather often because in the Greek medical literature we find a great many references to them. In the Hippocratic collection, already, we find a great many such references. Then, in the works of Galen, in the second century A.D., there are hundreds of passages devoted to cancer and other tumors, and besides he wrote a special monograph on tumors, our most important source. From the Middle Ages on, there is not a single surgical book that has not at least one chapter on the subject.

The descriptions we find in the ancient medical literature are by no means unequivocal. In many cases it is quite impossible to decide what kind of tumor was meant. How can it be else? An accurate distinction of the different kinds of tumors was not possible as long as there was no microscope. And even then the cell had to be discovered and the foundations of histology laid. Our systematization of tumors presupposed the

¹ Papyrus Ebers, translated by H. Joachim, Berlin, 1890, p. 193.

One, I believe, is that American patients as a rule are anything but patient. They want to be "fixed up" quickly. They want an operation if possible or, if this cannot be done, they want at least injections. Treatment in a health resort is an affair of several weeks, and such a lengthy treatment does not appeal to the average American patient quite apart from the costs involved. The trouble is that chronic diseases cannot be cured quickly.

But then there is another more complicated, a social and economic, reason. In Europe from the Middle Ages on, every spa had its "free bath," a section where indigent patients were treated free of charge. Considerable donations were often made to increase facilities for the poor. And when in the nineteenth and twentieth centuries health insurance was introduced in one country after another, treatment in health resorts became available to large groups of wage earners. The sickness insurance funds sent many patients to spas where they were treated at the expense of the funds. In Europe, therefore, such treatments were not a privilege of the rich.

The situation is totally different in America. We have no health insurance. We have no organization that would enable us to send large numbers of people of low income to health resorts. I know that some spas have plans for patients of moderate means and that they give charity treatments. "The U. S. Public Health Service maintains a Medical Center in Hot Springs National Park, Arkansas, for the treatment of medically indigent patients who are infected with venereal diseases. Patients are admitted only through the National Park Service Free Bath House where personal evaluation is made of each individual's financial status, and an oath of medical indigency is administered."⁹ In the fiscal year 1910, 4662 persons applied for treatment and 2280 were admitted for the treatment of venereal diseases.¹⁰ Saratoga Springs gave 23,245 charity treatments in 1939 to 1940. Since a "cure" requires about 18 treatments, the number of people reached was not very large. Some other spas may have similar provisions, but in a population of 130 millions this is not more than a drop in the bucket. Besides, it is not only a question of free treatments. Patients must travel to the spas, must lodge themselves, and first of all must be able to afford the loss of several weeks' wages.

As conditions are in America, treatment in a spa is primarily for people

⁹ From a circular of the United States Public Health Service.

¹⁰ *Annual Report of the Surgeon General of the Public Health Service of the United States for the fiscal year 1910*, p. 144.

cancer, has a very unsatisfactory task. I cannot tell you of high spots in the history of cancer, of periods of great discoveries, of waves of enthusiasm, as were observed when Koch discovered the tubercle bacillus, or Schaudinn the spirochete, or when Ehrlich brought out his salvarsan. The history of cancer is a dry history of errors and of many disappointments. The history of cancer is still in its primitive stage. The disease is still among us, threatening human society more than ever, and the fact particularly bewildering is that we are facing a biological problem that doesn't fit into our general biological conceptions. However, even in such a case, a historical survey might prove of some interest. There might be some enlightenment, even in the history of errors. And after all is there not heroism in the lost battle also?

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¹ *Papyrus Ebers*, translated by H. Joachim, Berlin, 1890, p. 193.

There are encouraging symptoms that show that American medicine is beginning to overcome its destructive skepticism and is developing a scientific attitude in this field also. The turning point came when the state of New York established a research institute at Saratoga springs, the first research institute of its kind on the American continent. The history is interesting. At the turn of the century the decline of Saratoga as a health resort was so great that a commercial company was exploiting the waters, pumping out 150 million gallons a year! The natural carbonic acid gas was extracted and used for the charging of various manufactured beverages. The springs ceased to flow, and the country was threatened with being deprived of some of its most valuable medicinal waters.

At this critical moment the state of New York stepped in. In 1909 the legislature passed a bill enabling the state to take control of the springs. The area with its 163 springs became a state reservation. It took seven years for the springs to return to their old level. The state then decided to develop the spa. In 1929 it appointed a commission with Bernard M. Baruch as chairman "to make a comprehensive study and survey of the mineral springs at Saratoga."¹⁴ The commission consulted with geologists and foreign balneologists; in cooperation with the New York Academy of Medicine it appointed a committee of physicians who "made intensive investigations both at Saratoga and at the chief resorts of Europe." The following year the commission already was able to present definite recommendations to the legislature. The state of New York spent 8.5 million dollars, and in 1935 the new Saratoga spa was opened. When it was completed the next year, it included a group of beautiful buildings, a hall of springs, two new bathhouses, a recreation unit, a hotel, and a bottling plant.

This was splendid in that it gave the country a unique health resort with facilities that compare very favorably with those of the best European spas. Still more significant, however, was the fact that the new development included a research institute. It was named after Dr. Simon Baruch, Bernard M. Baruch's father, a physician of vision who long before had had such a development in mind. Research is the spring that feeds all medical activities. When practice is dissociated from research, it soon degenerates into mere routine. Intensive research is particularly needed in such a field as balneology that has a long empirical but a very short scientific history.

¹⁴ Report of the Saratoga Springs Commission to the Legislature, Legislative Document (1930) No. 70, Albany, 1930.

out what the actual knowledge of the Greek physicians was in the case of cancer.²

What was the ancient therapy of such disease? In many cases the most salient feature was the ulcer, and the same treatment was applied as was used for other ulcers. Drugs, and chiefly metallic salts—salts of copper, and lead, then sulfur and arsenic—were applied, preparations that proved efficient in other cases and helped in the formation of granulations. Such treatments were recommended from Hippocrates on, even to our days. Sometimes the author reported that he had good results, and that the tumor was cured. But now, of course, we know that such a tumor in all probability was not cancer. Most of the ancient authors, however, did not expect much of such remedies and tried other cures. They tried to destroy the growth either by cauterization, or then they cut it out with the knife. But these operative treatments gave bad results, too. They did so because the surgeons had not the pathological-anatomical knowledge nor the operative technique necessary for such radical operations. They resigned, and the resignation of the most outstanding physicians in antiquity is perhaps best expressed by Celsus in his famous *Encyclopaedia*. He says:

Some physicians used caustic remedies. Some cauterized, and others operated with the knife. The remedies, however, never did any good to anybody. On the contrary, by cauterization the tumors were activated, and grew the faster, until the patient died. When they were cut out they came back after the scar had been formed, and brought death also. To distinguish a benignant tumor that can be cured from a cancer that cannot is hardly possible. All we can do is to watch and see what will happen.

In spite of the resignation there were always surgeons who tried to help the patient by operating on him. Celsus himself recommends the operation, in some cases, for instance, for tumors of the lips, and an Alexandrian surgeon of the second century A.D., Leonides, seems to have had a method of operating on cancer of the breast. He operated only when the tumor was not too far advanced. He amputated "a sanis partibus" and cauterized the whole wound.

The pessimism, however, prevailed for many centuries. A Salernitan surgeon, Roger, tells us that he sometimes saw cancer of the uterus operated, but without any result; on the contrary, the patients died much sooner than they would have done without any treatment. And a century

² The book of Jacob Wolff, *Die Lehre von der Krebskrankheit*, vols. I, II, and III, Jena, 1907-1913, is very valuable for the more recent period. In the chapter dealing with antiquity, the author generally uses secondary sources and is far from being satisfactory. I hope to publish a paper on this subject in the not too far distant future.

The foundation of the Simon Baruch Research Institute marked a date in the history of American medicine. It signified that America was catching up with European medicine in this field also, that balneology was becoming—very belatedly—a scientific discipline in this country as it already was in Europe. The institute was well conceived and well planned. The founders were aware that this was a new departure in American medicine and that the institute would have far more than local, that it would have national, significance. If anything, the research work of such an institute would be able to overcome the ignorance of the average physician about balneotherapy that was depriving thousands of chronic patients of the benefits of such treatments. Unfortunately the funds anticipated for the maintenance of the institute were not forthcoming. It is operating today, but on a very limited budget. Only part of the building serves its original purpose, and it is sad to find a dancing academy and a theater in rooms that were to be those of a temple of science. A beginning is made, nevertheless, and with Dr. Walter S. McClellan as Medical Director and Dr. Oskar Baudisch as Research Director, the Saratoga Springs Authority has embarked on its research program. Since private funds seem unobtainable, it is to be hoped that the State of New York, which has shown so much foresight and wisdom in developing the spa, will be aware of the historical significance of its research institute and will support it adequately for the benefit of the entire nation.

I would like to make a strong plea for the development of our American health resorts. We need them, not because European resorts are unavailable at the moment. There is no reason why our patients should have to go to Europe for such treatments. We need them because the chronic diseases, the diseases of mature and old age, are in the foreground, our major health problems today. We shall need them badly after the war not only for the veterans of the armed forces but also for the veterans of labor.

We need our resorts not only for the treatment but also for the prevention of serious diseases. We could use them as centers of rest and recreation under medical supervision. After a year of hard work in factories and in the fields, hundreds of thousands of men and women need more than a vacation. They need some repair. The fruit picker after a season of backbreaking work, the miner who for months inhales dust, the steel worker handling the white-hot metal, the textile worker spending the whole year standing at the loom, the elevator boy who lives in a cave, the shop girls and waitresses who try so very hard to conceal their

healing power that endeavors to restore the lost balance of health. In all inflammatory processes, the way this healing power works seemed perfectly clear. The inflammatory swelling turned into pus, and the pus was drained out. In this way the *materia peccans* left the body and the balance was restored. In the case of cancer, however, it seemed that the healing power of the organism did not work. There was no natural healing of tumors. The doctors' rules usually followed to help the organism in its healing tendencies could not be followed in this case. So in antiquity as well as today cancer did not fit into the general pathological conception. It was a puzzling problem for which satisfactory explanations could not be found, although Galen and many others did not admit it.

This theory of Galen's had consequences for the treatment also. Cancer, being the result of a disturbed mechanism of the humors, having therefore an internal constitutional origin, had to be treated internally too, and indeed Galen describes a certain diet to be followed by the patient suffering from cancer. Moreover, by applying purgative remedies and bleeding the patient, he endeavored to influence the humors. Galen's theories survived as long as the theory of the four humors did—that is, throughout the Middle Ages, the Renaissance, and far into the eighteenth century.

In the seventeenth century, however, a new explanation was sought for, according to the new pathological conceptions of the time. The discovery of the lymphatic vessels played a very important part. One thought that it was the lymph that carried the cancer material and, more than that, that the lymph was responsible for the gathering of tumors. The vague hypothetic humors of Greek medicine did not satisfy the physician any longer. These had achieved much in the realm of science. The carriers of the balance of health were no longer thought to be the humors but rather the physical forces and chemical substances. And such a substance was that lymph. Alterations of the lymph—its thickening or coagulation—might be responsible for the origin of cancer. The French school advanced this theory, as did John Hunter, and this theory brought further new improvements in the treatment that resulted in operating on or removing the lymphatic glands and destroying the lymph vessels in the area surrounding the tumor. The operation became more and more radical, as for instance in the case of the cancer of the breast, where the pectoralis major was removed, as it was feared that it might be affected by the lymph.

Particularly interesting are the views of John Hunter, a man we appre-

2. *Provision of teaching facilities.* Since ignorance of the average physician is the chief barrier, instruction must be provided and must begin with the medical students. No medical school has a chair for balneotherapy yet, and most clinical teachers have little experience in spa treatments. A first step toward solving the problem would be the establishment of research fellowships in the major spas of the country as the committee of physicians of Saratoga springs already recommended in 1930. Young clinicians would thus have an opportunity to become acquainted with the various health resorts and their therapeutic possibilities. After having returned to their schools they could instruct students. Physicians could be instructed in postgraduate courses of several weeks' duration.

3. *Creation of a literature.* Our literature on the science of health resorts is very poor compared with that of European countries. The Saratoga Springs Authority has taken the right step in publishing a series of very good pamphlets. The scientific papers prepared by the Committee on American Health Resorts will be a most welcome contribution. We have William Edward Fitch's book *Mineral Waters of the United States and American Spas*, published in 1927, which is the worthy successor to the works of John Bell (1831 and 1855),¹⁶ John J. Moorman (1867),¹⁷ George E. Walton (1873),¹⁸ A. N. Bell (1885),¹⁹ and James K. Crook (1899).²⁰ We have no book, however, that could in any way compare with the *Handbuch der Balneologie, medizinischen Klimatologie und Balneographie*,²¹ which has not been translated into English. A journal will have to be founded sooner or later. It will create a link between the various resorts and serve as a clearinghouse for scientific information. Its financing should not be difficult. The health resorts admitted to the approved list could be called upon to make initial contributions until the journal is firmly established.

4. *Organization of an American society for the science of health resorts*, or whatever it may be called. There is an American Clinical and Climatological Association that has a very distinguished record. Its chief

¹⁶ *On Baths and Mineral Waters, etc.*, Philadelphia, 1831; *The Mineral and Thermal Springs of the United States and Canada*, Philadelphia, 1835.

¹⁷ *The Mineral Water of the United States and Canada*, Baltimore, 1867.

¹⁸ *The Mineral Springs of the United States and Canada*, New York, 1873.

¹⁹ *Climatology and Mineral Waters of the United States*, New York, 1885.

²⁰ *The Mineral Waters of the United States and Their Therapeutic Uses*, New York and Philadelphia, 1899.

²¹ Edited by E. Dietrich and S. Kamlner, Leipzig, 1916-1926, 5 volumes.

the tumors. Cancer was described by him as the result of specified cell formations within the connective tissues of an organ. Virchow's work followed in the middle of the century. He described the heteroplastic tumors as proliferations of the connective tissue cells as a reaction against some kind of irritation. Thiersch and Waldeyer brought important modifications to Virchow's theory, and then Cohnheim established the theory of the congenital foundation for cancer. The twentieth century finally was devoted chiefly to experimental research that was made possible by great advancement in physiological chemistry.⁴ Today we know infinitely more of the biology of cancer than ever before. And yet the problem is still unsolved. In the last fifty years a great many theories were brought forth, but they all proved to be wrong. Our therapy is much more efficient today than it was before this time, and yet we have not found anything new. We have followed the principles and improved on the methods that the Greeks already had, and our results are far from being satisfactory. I remember the great Berlin surgeon August Bier said to me one day, "If a great scientist at the end of a brilliant career wants to make a fool of himself, he takes up the problem of cancer." This, unfortunately, happened in many cases. And yet the stronger the enemy, the more energy and the more intelligence we will have to develop in order to uncover his face and to fight him.

I personally have the feeling that the problem of cancer is not merely a biological and laboratory problem. But it belongs to a certain extent to the realm of philosophy. This, an X in the pathology of cancer, is a principle we do not understand yet. While we can understand most pathological processes as defense reactions or as healing processes, here we are facing a fact that does not fit at all into our general biological conceptions. Fortunately, we have overcome the speculative era in medicine. We know that a theory is not true by the mere fact that we think it to be so, but it has to be demonstrated and proved experimentally. And yet all experiments require certain philosophical preparation. And I have the feeling that in the case of cancer many experiments were undertaken without the necessary philosophical background, and therefore proved to be useless.

⁴ "Experimental Cancer, an Historical Retrospect," from the laboratories of the Philadelphia General Hospital, by E. B. Krumpholtz, Philadelphia, Pa., *Annals of Medical History*, 7, 1925.

SCIENCE AND HISTORY



SO far the lectures in this series have been dealing with various aspects of modern science as the foundation of modern medicine. May I be allowed to look at science from a somewhat different angle? Science and history seem to have very little in common. Few scientists are interested in history, and modern science is so absorbing that it leaves little time for studies in other fields. A scientist who formerly was well known once said to me that he was not interested in studying history because he was making history. He is dead now, and unfortunately very little of his work has stood the test of time. The historian, on the other hand, has a very scanty knowledge of science, not much more than what he learned in secondary school. And yet the two, science and history, have much more in common than appears on the surface. The sharp division between science and the humanities is artificial, a late development, the result of specialization. It did not exist in the Renaissance. Girolamo Fracastoro, the four-hundredth anniversary of whose death was commemorated widely in 1953, was a physician, to be sure, who made important contributions to our knowledge of contagion and contagious diseases, but he was a humanist first and foremost, who wrote poetry and whose range of interests was extraordinarily wide. His contemporary Paracelsus was a physician also, but he wrote theological and philosophical works. And even in the eighteenth century we do not find that sharp distinction be-

This revival was not only due to the desire of making natural curative forces available and to an improved road system that made traveling easier, it was also a result of the development of the city. As long as people lived under rural conditions, they did not feel the need for a vacation spent in a different environment. The city dwellers, however, who lived the whole year round confined within the city walls, developed a desire to leave the town for a few weeks every year and to spend the time in totally different surroundings. Many mineral springs are located in pleasant landscapes, often in mountainous regions where the climate is invigorating. What was more logical for a family who could afford it than to spend a few weeks at a spa? There the members who were not sick found good company, recreation, and amusement, and those who were suffering from some chronic ailment could obtain a treatment which greatly alleviated their condition. Thus many European spas became general health resorts and fashionable meeting grounds for vacationists, sought by sick and healthy alike. Others that were difficult of access, such as Pfeffers in Switzerland where the spring is at the bottom of a steep gorge, had no amusements to offer, but their waters were famous and were used by an endless number of patients who could not be deterred by the hardships of the journey.

Medicinal springs and their curative powers are mentioned by ancient and medieval medical writers. The virtues of the waters of Pozzuoli and other spas were described in the Middle Ages in special monographs or pamphlets. The revival of scientific interest during the Renaissance drew the attention of physicians to the springs more than ever before.³ Paracelsus did pioneering work in this field also. Equally experienced in medicine and chemistry, he visited many European spas and analyzed their waters. He frequently mentions medicinal springs and their use in his writings, and he wrote a little monograph on Pfeffers,⁴ a place which was sought in those days by many famous syphilitic patients. From the Renaissance on, the literature on balneology increased considerably.

The European spas have been used for over 2000 years. Medical theories changed. Galenic doctrines dominated medicine for almost fifteen centuries. Paracelsus attacked them and developed a new theory of medicine based on chemical concepts. Iatrochemists and iatrophysicists, mechanists and spiritualists, had their periods of vogue until a medical science

³ See the collection *De Balneis*, Venice, 1533, which contains the most important ancient and medieval texts on the subject.

⁴ *Von dem Bad Pfeffers in Oberschwytz gelegen*, 1535.

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the Rocky Mountains and the Appalachians. I do not think there is one mineral water in Europe that could not be matched in America. The country has 2717 areas in which medicinal springs are found, with 8826 springs.⁶ Wyoming is leading with 2244 springs; next follows Texas, then Missouri, California, Colorado, New York; North Dakota is at the bottom of the list with no known mineral springs at all. Of all areas explored in the country, 424 are used commercially and 321 have been developed at some time or other as health resorts. This seems an impressive figure. Yet when we examine it more closely we soon find that many resorts have been discontinued, that many are undeveloped, with poor accommodations, poor medical facilities, and no facilities for research at all. The number of spas that can compare today with the best European ones hardly exceeds a dozen.

According to tradition the Indians were the first to use the mineral springs of the country for medical purposes, and they are said to have drawn the attention of the white man to the waters and their curative powers. Several of the Virginia springs were already used in colonial days.⁷ Virginia Hot Springs in the Alleghenies was visited by white men as early as 1720, and the first tavern was built there in 1766. The highly radioactive water, which has a temperature of 110 degrees, became very popular and has remained so to our day. The spring, which today is in Berkeley Springs, W. Va., was the property of Lord Fairfax, who gave it to the colony of Virginia before the Revolution. In 1775 the assembly of Virginia decided to build a town around the spring and began selling lots. The place was called Bath, and it was to become an American Bath comparable to England's most famous watering place. George Washington used the waters. The spring has remained state property. White Sulphur Springs, W. Va., was used from 1778 on, and the first cottages were built in 1804. Sweet Springs, W. Va., was discovered in 1764. Beginnings were primitive there as in other places. Log cabins were erected around the spring in 1773, but there was no bathhouse and people bathed in an open pool. A two story hotel was built in 1792, and the place soon became a health and pleasure resort.

Many other medicinal springs were found in the mountains of Virginia, and in the 1830's it became the custom to take the springs tour

⁶ W. P. Beazell, *The Spas of the Eastern United States*, Report of the Saratoga Springs Commission to the Legislature, Legislative Document (1930) No. 70, Albany, 1930.

⁷ Perceval Reniers, *The Springs of Virginia, Life, Love, and Death at the Waters, 1775-1900*, Chapel Hill, N.C., 1941.

science. Within the framework of the society of which he is a member the poet expresses the fears and hopes, the joys and anxieties, that he and many of his contemporaries feel and does it in a given style which is the style of his period. He does not have to build on the accumulated experience of the centuries, but the scientist does. An observation may be correct, but it is wasted if the time is not ripe and the foundations are missing. Let me give you a very simple example from the medical literature of ancient Greece.

The Hippocratic physicians observed that in certain cases of bronchitis you heard a distinctive murmur inside the chest which sounded like boiling vinegar. In the case of dry pleurisy they heard something that sounded as if a new leather strap was bent to and fro. In other cases of pleurisy they shook the patient—this method was later to be named *succussio Hippocratis*—and heard a distinct sound. In other words the Greeks in the fifth century B.C. had found the principle of auscultation. Why did they not develop it? Why did the world have to wait for Laënnec before auscultation became a generally accepted method of examination? For the simple reason that the Greeks did not think in terms of pathological anatomy. Since the middle of the eighteenth century we have known that many symptoms of disease are the functional expression of anatomical changes in the organs, and therefore methods were developed so that these changes could be perceived with our sense organs in the living patient. In 1761 the Viennese physician Auenbrugger invented the method of percussion, and it was not by accident that this invention was made by the son of an innkeeper who used to knock at his kegs in order to hear whether they were full or empty. Nor was it an accident that he was a good musician, as was also Laënnec, because only people with a good ear were able to discover slight differences in sounds. Auenbrugger's book is a classic, and it is interesting to read that he thought he could find changes in the chest in cases of nostalgia, which we know to be anything but a pulmonary disease. Nostalgia, however, is an excellent example showing how medical views are sometimes determined by outside factors and are time-bound.

An Alsatian medical student, Johannes Hofer, wrote a doctoral dissertation in 1611 at the University of Basel under the title *De Nostalgia oder Heimwehe* in which he described nostalgia as a disease entity of its own. The dissertation met with immediate success, was reprinted, and translated. J. J. Scheuchzer took up the subject and attributed responsibility for the disease to the air. It was for very good reasons that Swiss

In the middle of the nineteenth century the American spas had a period of great vogue. They were famous not so much for their waters as for their horse races, gambling places, theaters, and other entertainments. They were resorts for the idle and rich, with luxurious hotels, parks, and casinos. The waters were used, to be sure, because it was fashionable to use them, but in most cases they were a mere accessory and a pretext for social life.

The decline came toward the end of the century. Many spas were discontinued; others still show the remains of former splendor, gigantic hotels that are closed most of the time, casinos that have been turned into dusty museums. The glories of the old days when southern landlords, New York millionaires, adventurers, and expensive prostitutes mixed in glamorous intercourse are revived from time to time in novels such as Edna Ferber's *Saratoga Trunk*.

There are various reasons for the decline of the American spas. At the turn of the century they had to compete with other resorts, particularly those at the seashore such as Newport and Atlantic City. The spas had an asset which other places had not, namely their medicinal springs. But the fame and popularity of the spas in America, unlike Europe, was not based on the curative powers of the waters but on the accessories, the entertainments and amusements that other resorts could supply just as well.

At the same time in the 1890's, American medicine was becoming scientific. The Johns Hopkins Hospital and School of Medicine had been opened, and physicians were trained in laboratories and in hospital wards. Most of the spas were privately owned and operated for profit. The waters were frequently advertised as cure-alls in a manner that did not inspire confidence among scientifically trained physicians. The logical step would have been to establish research institutes in order to ascertain scientifically what balneological treatment could effect. The country, however, was busy with the reorganization of its medical schools and hospitals. Other scientific problems seemed much more urgent, and the physicians with few exceptions simply discarded the spas.

If you ask an average American doctor what he thinks of treatment in a health resort, he will smile ironically and will tell you that such a treatment can do no harm but is hardly more than some kind of psychotherapy. While balneology is paid increasing attention in European medicine, American medicine as a whole persists in neglecting it. There are various reasons for this peculiar American attitude.

graph written by an outstanding Italian physician, Giorgio Baglivi, who studied the disease on the spot.²

There was only one cure for the disease, and this was music and dancing. Bands of musicians roamed the country at the height of summer playing the tarantella, repeating the tunes an endless number of times until people broke down perspiring profusely, whereupon they were cured, at least for that year, but the following year the sound of the tarantella would reactivate the poison that was believed to be in their system. We know the music that was played, as the learned Jesuit father Athanasius Kircher collected the tunes and published them in his work *Magnes sive de Arte Magnetica*, in 1641. Baglivi, being a good iatro-mechanist, explained the action of the poison mechanically, but as early as the eighteenth century it was found that the sting of the tarantula was perfectly harmless or at least not more harmful than the sting of a bee or a wasp. The explanation must be sought in a totally different direction. In 1621 a physician, Epiphanius Ferdinandus, put his finger on the right spot when he said that some people considered the disease *melancholiae seu amentias quaedam species*, some kind of melancholy or insanity, and this neurosis becomes understandable when one remembers that it occurred in a region where orgiastic cults, the cults of Dionysus, Cybele, Demeter, and others were celebrated, cults which had a decidedly erotic character. Christianity came late to Apulia and came to a primitive and conservative population in which ancient beliefs and customs were deeply rooted. The pagan rites, so popular with the people, were now considered sinful. But they survived nevertheless, probably in secret, and one day they came to the light again as symptoms of a disease which not only excused but legitimized them. It is one of many pagan institutions that survived in the Christian world after having changed meaning.

The observation of the Hippocratic physicians of murmurs within the chest in certain diseased conditions showed that a correct observation cannot be developed if the time is not yet ripe for it. If we go back to the Hippocratic writings we may find, however, that observation and correct reasoning could give good results even if the theory was wrong. Thus the Greeks knew that pneumonia did not always end in crisis but that sometimes empyema developed. According to the theory, pneumonia

² Giorgio Baglivi, *Dissertatio de Anatome Morsu et Effectibus Tarantulae*, written in 1693, published in the various editions of his *Opera Omnia*. English translation in the various editions of his *The Practice of Physick*. Other literature on tarantism in H. E. Sigerist, *Civilisation and Disease*, Ithaca, N. Y., 1943.

of some means. Rich people, however, preferred to seek the highly developed European resorts where an ocean separated them from their office, where they were sure to find the best possible medical facilities, highly competent physicians, and the many amenities that such places usually offer. It has been estimated that in 1930 100,000 Americans took treatments in European spas, spending 100 million dollars there.¹¹

As a result of these conditions most American spas remained undeveloped or became social resorts, more famous for their golf courses than for their waters, and the consequence was that our medical students were not instructed in the matter and that the majority of our physicians therefore believe that treatment in health resorts is a swindle or at best a dignified medical superstition, if not a European racket.

It is very unscientific to deny the experience of 2000 years merely because we have no ready-made theory that explains all phenomena in every detail. It would have been foolish to deny the existence of lightning because electricity was not yet known. Experience has preceded science in medicine more than once. Our most valuable drugs, quinine, digitalis, opium, mercury, and many others, were given for centuries, long before pharmacology was able to explain their action. Oskar Baudisch has very pertinently shown how similar the situation was with regard to heliotherapy.¹² Sunlight was used as a healing agent for centuries. Rickets were treated with ultraviolet rays. To "scientific physicians" this was a mere superstition—until the vitamins were discovered and it was found that sunlight changes the ergosterol of the skin into vitamin D. Chemistry until recently was gross chemistry; microchemistry is in its infancy still, and we are beginning to realize that a few molecules of a chemical compound can cause definite biological reactions. The theory of dissociation and the discovery of radioactivity greatly stimulated the study of medicinal springs, and Baudisch has pointed out how important and illuminating Alfred Werner's concept of coordination valency (covalency) is in this particular field.¹³

The scientific attitude toward spa treatment, in my opinion, is to use natural curative forces on the basis of the rich clinical experience already available today, and at the same time to promote laboratory and clinical research most energetically.

¹¹ W. P. Beazell, *op. cit.*

¹² Oskar Baudisch, "Magic and Science of Natural Healing Waters," *Journal of Chemical Education* 16:442, 1939.

¹³ Baudisch, *ibid.*, pp. 445-446.

through a miasma which then multiplies in the body and is passed on to large numbers of individuals. If, however, miasma and contagium can produce the same disease they must be identical, and must be not only organic but live material which develops in the body like a parasite. Henle's treatise was a masterpiece of logic and was correct in all its basic assumptions, yet there was no response to it. Why? Again due to the time element. In 1840 German medicine was just liberating itself from the lofty speculations of *Naturphilosophie*, and people wanted to see things and not merely believe in them. Twenty years later, Pasteur and Rôbert Koch were able to show under the microscope what the miasmas and contagiums actually were and thus satisfy the inquisitive spirit of a rationalist age.

In 1928 the tercentenary of the publication of William Harvey's book describing the circulation of the blood was commemorated all over the world. I was at the University of Leipzig at the time and was asked to give a formal address on the occasion. I did not want to repeat what had been so aptly said many times before, that Harvey was a brilliant investigator—there had been many others before and after him—that he made the experimental method one of the chief methods of research in biology, that he very successfully applied quantitative considerations. Experiments had been performed before Harvey, and one of his contemporaries Santorio Santorio tried to solve another biological problem quantitatively, the problem of metabolism. To that end he spent part of his life on scales weighing carefully what entered and what left his body, but the problem was one that could not be solved before the revolution in chemistry brought about by Lavoisier. It puzzled me to know why the circulation of the blood was discovered in the first half of the seventeenth century; why not before, why not later? There were many brilliant anatomists in the sixteenth century, and even before that time the lesser circulation had been seen incidentally by some and described, although its full significance was not recognized. If we wish to understand correctly a new scientific development, we must study it within the framework of the general civilization of the period, studying that civilization in all its aspects, economic, social, literary, artistic, etc. When we do this in the case of Harvey we soon find that at the end of the sixteenth century and in the early seventeenth century a basic change took place in man's outlook on the world. The relation between the individual and the world changed, and he looked at it with different eyes. A new art developed with Michelangelo—an art which matured in the seventeenth

This was clearly realized by the committee of physicians that in its report to the legislature of 1930 recommended:

(c) That steps be taken toward the establishment of a scientific institute at Saratoga whose functions should be threefold.

The first function would be to provide modern laboratory facilities for diagnostic work, this to include facilities for radiology, cardiology, basal metabolism, serology, bacteriology, and other diagnostic aids.

The second department, closely linked to the laboratory, would be devoted exclusively to research work in balneotherapy, and other methods of treatment of chronic disease. This department would offer the physicians of the state educational opportunities for the study of the nature and treatment of chronic diseases.

The third department would be given over to the study of the geology of the district and the physical and chemical properties of the waters; this department to be under the direction of a competent modern chemist, while the laboratory and research divisions to be under the direction of a skilled medical director with a good clinical background, and of a research type of mind. The research and experimental work, as well as the educational facilities, might be associated with one or more medical schools of the State. A direct affiliation with the Albany Medical School readily suggests itself because of its proximity to Saratoga Springs.

The relationship of the institute to the medical practitioners should be worked out in conference with representatives of the State Medical Society and of the local physicians.

(d) In connection with this institute a fully equipped department of physiotherapy should be developed. It should comprise facilities for the various kinds of physio-, thermo-, hydro- and electro-therapy, as well as inhalatoria, gas baths, sun baths, open air as well as enclosed gymnasia, and other features of special therapy.

(e) The institute should be built on State property in close proximity to the bathing establishments. In its directly utilitarian aspects, i.e., in its laboratory work and its physio-therapeutic equipment, it should be built and maintained by the State, although in all probability the charges made for service rendered will cover the cost of its maintenance. For the research works, which would be one of its outstanding features, continuous maintenance should be assured. This institute should be managed by a board of trustees, or a board of scientific control, appointed in a manner which will properly safeguard its purpose.

(f) The selection of the Medical Director and his staff should be the responsibility of the board of trustees or the board of scientific control.

(g) It would, perhaps, be desirable to consider a plan whereby fellowships would be granted to young physicians for travel and study abroad, and to organize, at Saratoga or elsewhere, courses in balneotherapy when the opportune time comes.

(h) The clinical material for research purposes could come from both the ordinary patients and the patients who would be accommodated free of charge, or at greatly reduced cost. A rule should be adopted that no one could pursue a course of treatment at Saratoga without medical direction by physicians recognized by the management of the spa.

machines described by Hero of Alexandria remained to a large extent on paper. Conditions changed when the Roman Empire was pacified and slaves became rarer and more expensive, and even more so when slavery was abolished altogether in Christian Europe. There was a great shortage of labor in the Middle Ages, and as a result great efforts were made to make better use of animal power, water power, and wind power.

In the Renaissance the demand for metals increased considerably. An increased volume of trade required more gold as a medium of exchange, and voyages of discovery were launched in search of gold. It was found in Mexico, in Peru, and the early expeditions to North America were also undertaken in the search for gold. The new firearms demanded more copper and lead, and since the shallow deposits of minerals were exhausted new machinery was required and new health hazards created. It is not by accident that the first monographs on occupational diseases and particularly on miners' diseases were written at that time.

Men of my generation have experienced two world wars. Both brought endless destruction and suffering to the world, but we cannot deny that they were also a strong stimulus to science. We remember what aviation was before World War I and how tremendously it developed during and after the war. The second World War brought radar, the use of atomic energy, and speed in the application of the sulfa drugs, penicillin, and DDT which would have been quite impossible without the pressure of war. War means destruction. But it is no fault of the scientists if their discoveries are used for destructive purposes. It is the fault of the people who have not yet learned to create the social organization that the new science requires. The *New Yorker*, that greatest of all American magazines, printed a highly significant cartoon a few years ago. A young man was telling his parents that he wanted to become a scientist, whereupon one of the parents, terrified, said, "Isn't there enough trouble in the world already?" How far have we moved from the hopes of the eighteenth and nineteenth centuries when it was assumed that science would be the means of liberating the people once and for all from the bonds of disease, hunger, and poverty?

The time element also noticeably affects the speed with which a discovery is accepted. Auenbrugger's percussion was a most valuable invention as it gave the physician an extremely useful diagnostic method, but hardly any notice was taken of it at the time his book was published and almost half a century passed before the method was seriously discussed and then gradually accepted. The authority of Corvisart, physician-in-

weariness and anemia with rouge and paint—how would it be if they could spend a few weeks in a health resort, have a physical check-up, combine vacation with treatment, and have their minor ailments, the result of hard work, treated before they develop into serious diseases—their beginning rheumatisms, arthritis, bronchitis, digestive troubles, varicose veins, gynecological ailments? Would this not be sound preventive medicine and sound economics as well?

This is not Utopian. There are countries where this is practiced on a large scale. We can do it also. All that we need is organization and intelligent planning.

In 1938 the House of Delegates of the American Medical Association, recognizing the value of treatments in health resorts, authorized the appointment of a committee on American health resorts. The committee was duly appointed by the Board of Trustees and consists of highly competent men with great experience in the field. Now after four years the committee is preparing a list of approved health resorts.¹⁵ It has established minimum requirements that a health resort must meet before it can be included in the list. This is a sound step that will separate the tares from the wheat. It will protect the public and will raise standards.

As a second move the committee is preparing a series of scientific papers on various phases of health resort therapy. They will be published in the *Journal of the American Medical Association* and, as I hear, may later be issued as a volume.

All this is a sound but a very modest beginning. The committee without any doubt will soon have to face other tasks among which will be the following:

1. *Insistence upon the necessity of research.* One institute obviously is not enough in so large a country with such a variety of natural curative forces. Additional research institutes must be founded in strategic points where the curative factors are different from those of Saratoga Springs. Institutes must have laboratory and clinical facilities. Unless patients are hospitalized and thus under constant medical supervision, it is difficult to obtain accurate clinical data. Health authorities, state and federal, must be interested in such projects, and it should be demonstrated to politicians that investments in health resorts are self-liquidating and will ultimately represent a considerable saving. This is bound to occur, since treatment in health resorts can prevent the development of serious disabling illnesses and reduce the disability caused by chronic diseases.

¹⁵ *Journal of the American Medical Association* 118:379, 1942.

changes in the living organisms. The X-ray, which permitted one to look through the body, was eagerly accepted in a very short time. A factor which must be kept in mind also is that Roentgen never took a patent on his discovery, but even if he had the method would have been adopted without delay.

The time factor plays a part in another sense, and, to illustrate this, I would like to go back to Paracelsus and to one of his most inspiring books, the *Volumen Paramirum*, a book on which he worked for many years and which he completed around 1530.⁴ The book is not easy to read as it is written in the symbolic terms so dear to the author, but it is undoubtedly the ripest fruit of Paracelsus' thought. It is an attempt to outline a medical anthropology. Five spheres, five entities determine man's life in health and disease. The first is *ens astrale*, of which I shall have more to say in a moment. The second is *ens veneni*. Man is part of nature; he lives in a physical environment from which he derives matter and energy. Food comes from nature, but so does poison; there are normal but also abnormal stimulations. Everything that comes from nature is both good and evil: food is good; poison is evil; but poison may also be a remedy. It is the dosage that determines the effect. The third sphere is *ens naturale*. Men may be contemporaries, but no two are identical and we know well enough that no two individuals have the same fingerprint or the same handwriting. Every individual is born with a nature of his own and to a large extent carries his destiny within himself. The fourth sphere is *ens spirituale*. Man has body and mind like all other animals; they are one inasmuch as they determine one another mutually. But man is an animal of a special kind. He is conscious of himself and of his past; he not only feels pain but is able to reflect about the phenomenon of pain and to establish abstract concepts. Thus the spirit in Paracelsus' terminology gives man a special position in nature, and from the spirit causes of disease may also arise.

Now let us go back to the first entity. What is *ens astrale*? The stars move according to eternal laws, and so does man's life. The constellation characterizes a given moment, and every individual has his moment, his historical time, which affects his life in health and disease. This is a very fine and correct thought. Thirty years ago I had an ordinary pneumococcus pneumonia which developed into an empyema, and I was ill for many months. Today the same pneumonia would have been cured in

⁴ An English translation by K. F. Leidcker was published as Supplement No. 11 to *Bulletin of the History of Medicine*, Baltimore, 1949.

interest, however, lies in general clinical medicine. Once the science of health resorts develops, the need for a forum will undoubtedly be felt.

5. *Organization of an American association of health resorts.* The resorts have many problems and interests, scientific and economic, in common. A permanent secretariat would serve as a clearinghouse and could become a valuable source of information for physicians and public alike. It would be a distributing agency for literature on the various spas and could supply information concerning medical facilities available and costs of treatments.

6. And finally, steps should be taken now to *plan for a broadly conceived social program* that would make our health resorts available to the mass of the people and would develop them into strong centers of human conservation. In the reorganization of medical services that is bound to come after the war, our health resorts can play a very important part. Thought should be given to the subject in time, and plans should be discussed with health and welfare authorities, trade unions, farm groups, and consumers' organizations.

I am well aware that this is an ambitious program that cannot be realized over night, but, if ever, it is timely now when the foreign competition has dropped out and the country must rely on its own resources. America is blessed with all curative forces nature can provide. It is up to us to use them intelligently for the benefit of the people.

of our own century, science created new industries directly, such as the electrical, the chemical, the food and cosmetics industries, and a second industrial revolution took place which affected the western world as strongly as the first. The splitting of the atom may well inaugurate a third industrial revolution, and let us hope that it will be for the benefit and not for the destruction of mankind.

The industrialization of the West created a new social and economic order. The majority of people became wage earners or salaried employees who depended for their living on the labor market, over which they had no control. The working class organized itself in militant trade unions and political parties. The polarization of society to the right and to the left is a process in the midst of which we still find ourselves today. The industrialization of the West also created a new political outlook. Sources of raw material were needed to feed the industries and foreign markets to absorb their products, thus leading every western country to endeavor to build a colonial empire.

In the field of biology Darwin's theory of evolution had a profound influence upon philosophic and religious thought, so much so that its teaching is still forbidden in parts of America. As a result of science, the general material standard of living was raised, at least in some western countries. Life has become safer, more comfortable, and we have an infinity of enjoyable gadgets. Science is worshipped, and there is no better recommendation for a toothpaste or breakfast cereal than to advertise it as being scientific. A man like Einstein is universally respected, although very few people understand what his contribution to science has been. But he is highly esteemed as the embodiment and symbol of science.

Science, however, also knows of many frustrations. Industries apply scientific principles to their production, to be sure, but by no means freely. We all know of the endless number of patents that are purchased by firms in order to be suppressed, in order to forestall competition, or because a firm wants to use up its old machinery. Governments do not act scientifically. They consult with scientists, obviously—hundreds or even thousands of scientists are in the government service as experts, and in the United States the Department of Agriculture is one of the foremost scientific research institutions of the country. But politics are the result of compromise; conflicts of vested interests are unavoidable. Foreign policy is still less scientific. If we could exploit the resources of the world scientifically, if production, distribution, and consumption could be organized along scientific lines, the standard of living would be raised con-

speed unknown heretofore. The Hippocratic chair died a natural death. The time had come to look upon Hippocrates not as a demigod but as a fifth century B.C. Greek physician; to look at the *Corpus Hippocraticum* not as on a book of revelations but as on a literary expression of fifth century Greece.

Emile Littré entered the scene. Applying the critical methods of classical philology, studying all the manuscripts known at the time, he endeavored to restore the original text. Translating it into French, he interpreted it. And in a series of splendid essays introducing the different treatises he wrote in a most scholarly way as many dissertations on the manifold and intricate problems of the *Corpus Hippocraticum*.

In this way Emile Littré created a definite picture of Hippocrates and Hippocratic medicine that has entered the textbooks and is well known to all who are familiar with the history of medicine.

The work initiated by Littré didn't stop. Much has since been written on Hippocrates and the *Corpus*. Right in our day we can witness a revival of interest in these problems. I thought that it might interest the readers of this bulletin to hear what has been done on the subject in the last few years, how far our picture of Hippocratic medicine has been changed, what the present status of the problem is.

§

Who was Hippocrates? A well-known physician, teacher of the healing art, an Asklepiad, born in Cos, who lived towards the end of the fifth century and in the first half of the fourth century B.C. This is all we know from contemporary sources, two passages in the *Dialogues* of Plato (Protagoras, 311 b; Phaidros, 270 c).¹ Centuries later, when Hippocrates occupied a central position in Greek medicine, legends arose around his name which, like many legends, may have had a certain foundation, may have been the final expression of old traditions. As long, however, as we have no authentic documents, we will have to accept the legends for what they are without attributing to them any biographical value.²

Considering this very regrettable lack of sources, we eagerly awaited

¹ To which we may eventually have to add an inscription in Delphi: Pomtov, "Hippokrates und die Asklepiaden in Delphi," *Klio* 15:141; R. Herzog, "Das delphische Orakel als ethischer Preisrichter," in E. Hornsfeiler, *Der junge Plato*, vol. 1, 1922, p. 164.

² Two papers on the legends concerning Hippocrates are being prepared by a member of our Institute, and will be published in later issues of this bulletin [*Bulletin of the History of Medicine*].

will be unavoidable. A brilliantly written book, a "biographie romancée," a product of the "biographical industry." Doctors who are tired of reading detective stories before going to sleep will revel in reading this book. The author has collected whatever has been written on Hippocrates in the last 2000 years and has read Littré's translation carefully. With this material in hand he has created a powerful story, a great picture of what an ancient doctor could have been. Why not? There is no harm in it as long as we are aware that we are reading fiction and not history. On the cover of the book the stoic philosopher Chrysippus is represented after the well-known bust of the British Museum, which was formerly believed to be Hippocrates. We are glad to hear that the author's next two books will be real novels, and we certainly admire the liberality and the literary taste of the medical faculty that accepted this book as an inaugural dissertation.

§

If we want to know what Hippocratic medicine was like, we have to consult the *Corpus Hippocraticum*. The best complete edition still is Littré's edition.⁸ Good as it is, it certainly has very serious deficiencies. It was a first attempt at a critical edition, and as such is necessarily imperfect. Littré based his text almost exclusively on the Paris manuscripts. But there are other very important manuscripts extant which are very helpful in elucidating obscure passages. It was to be expected therefore that new editions based on a broader manuscript foundation would be attempted. The most important of these undoubtedly was the edition of Ilberg and Kühlewein,⁹ who succeeded in improving Littré's text in many respects, but unfortunately never completing their work. A first volume was issued in 1894, a second followed eight years later in 1902, and then the publication stopped. It stopped because in the meantime the Academic Union, under the leadership of Hermann Diels and the Prussian Academy, had decided on the publication of the *Corpus Medicorum Graecorum*, a collection that was to include critical editions of all Greek medical texts that have come down to us. One of the most important items of the collection, naturally, was to be a new complete edition of the *Corpus Hippocraticum*.

⁸ *Oeuvres Complètes d'Hippocrate, Traduction Nouvelle, avec le Texte Grec en regard* . . . par E. Littré, Paris, 1839-1861, 10 volumes.

⁹ *Hippocratis Opera Quae Feruntur Omnia*, rec. H. Kuehlewein (Prolegomena conscripserunt I. Ilberg et H. Kuehlewein), Leipzig, 1894-1902, 2 volumes.

physicians were particularly interested in this disease. At that time many Swiss soldiers were in foreign service, and it happened occasionally that one of them became so homesick that he deserted. Such a highly dishonorable action was resented by the whole nation. If homesickness, however, were a physical ailment caused by changes of atmospheric pressure when a mountaineer went to live in the lowlands, then there was an excuse for desertion, disease being always considered as an accident which excused people from many of the obligations under which people in good health stood.¹

Another example of a strange time-conditioned disease is that of tarantism. It occurred in southern Italy, particularly in Apulia, in the Middle Ages and the Renaissance, and we have descriptions of it even from the seventeenth and eighteenth centuries. The disease was attributed to the sting of a spider, the tarantula. People were attacked by it at the height of the summer heat, in July and August. They suddenly jumped up, feeling an acute pain like the sting of a bee. Some saw the spider; others did not, but they knew it must be the tarantula. They ran out of the house into the street, to the market place, dancing in great excitement. Soon they were joined by others who like them, had just been bitten or by people who had been stung in previous years, for the disease remained in the body and was reactivated every year by the heat of summer. People were known to have relapsed every summer for thirty years. All ages were affected, children as well as old people, although most of them were men and women in the prime of life. More women than men were attacked by the disease. Its victims were mostly peasant people, but ladies and gentlemen and even worthy monks and nuns were not spared. People danced wildly in the queerest attire, dressed in strange costumes with necklaces, in dresses of bright color, red, green, and yellow, but they could not endure the sight of black. Some would tear their clothes and show their nakedness, losing all sense of modesty. They waved red cloths in their hands, wore wreaths of vine leaves and waved boughs of vine. Some called for swords and acted like fencers, others for whips and flagellated each other; women called for mirrors and howled, making indecent motions. Others again liked to be tossed in the air, while still others rolled in the dirt like swine. They all drank wine plentifully and acted and talked like drunken people. We owe these details to a mono-

¹ For the history of nostalgia see Fritz Ernst, *Vom Heimweh*, Zurich, 1949. An English translation of Hofer's dissertation was published in *Bulletin of the Institute of the History of Medicine* 2:376, 1934.

will be unavoidable. A brilliantly written book, a "biographie romancée," a product of the "biographical industry." Doctors who are tired of reading detective stories before going to sleep will revel in reading this book. The author has collected whatever has been written on Hippocrates in the last 2000 years and has read Littré's translation carefully. With this material in hand he has created a powerful story, a great picture of what an ancient doctor could have been. Why not? There is no harm in it as long as we are aware that we are reading fiction and not history. On the cover of the book the stoic philosopher Chrysippus is represented after the well-known bust of the British Museum, which was formerly believed to be Hippocrates. We are glad to hear that the author's next two books will be real novels, and we certainly admire the liberality and the literary taste of the medical faculty that accepted this book as an inaugural dissertation.

§

If we want to know what Hippocratic medicine was like, we have to consult the *Corpus Hippocraticum*. The best complete edition still is Littré's edition.⁸ Good as it is, it certainly has very serious deficiencies. It was a first attempt at a critical edition, and as such is necessarily imperfect. Littré based his text almost exclusively on the Paris manuscripts. But there are other very important manuscripts extant which are very helpful in elucidating obscure passages. It was to be expected therefore that new editions based on a broader manuscript foundation would be attempted. The most important of these undoubtedly was the edition of Ilberg and Kühlewein,⁹ who succeeded in improving Littré's text in many respects, but unfortunately never completing their work. A first volume was issued in 1894, a second followed eight years later in 1902, and then the publication stopped. It stopped because in the meantime the Academic Union, under the leadership of Hermann Diels and the Prussian Academy, had decided on the publication of the *Corpus Medicorum Græcorum*, a collection that was to include critical editions of all Greek medical texts that have come down to us. One of the most important items of the collection, naturally, was to be a new complete edition of the *Corpus Hippocraticum*.

⁸ *Œuvres Complètes d'Hippocrate, Traduction Nouvelle, avec le Texte Grec en regard* . . . , par F. Littré, Paris, 1839 1861, 10 volumes.

⁹ *Hippocratis Opera Quae Feruntur Omnia*, rec. H. Kühlewein (Prolegomena conscripserunt I. Ilberg et H. Kühlewein), Leipzig, 1894 1902, 2 volumes.

was a phlegmatic disease; the phlegm became pus which accumulated in the pleural cavity and had to be driven out through the natural healing power of the body. The pus would then either break through the wall of the chest or into the bronchi. The Greeks knew that such a process took a very long time, so long in fact that the patient had a good chance of dying before the pus had broken through. The physician's task therefore was to help nature in its healing tendency, that is, to create an artificial opening for the pus to break through. The problem, however, was to find the pus, and to know where the incision should be made. To us this is very easy because we have the method of percussion, we have X-rays, and we can make an exploratory puncture. The Greeks did not have any of these methods, and they had to rely on reasoning. Empyema was an inflammatory disease. Hence heat was developed, and the point of greatest heat must be the point where the pus had collected and where the incision was to be made. But it was not easy to find that point. Putting the hand on the chest would not have been reliable enough. So they devised a very simple method, stirred a fine clay in water, and applied this suspension rapidly to the back of the chest. The point where the clay dried first obviously was the hottest spot, and there the incision was made.

Aristarchus in the third century B.C. taught at Alexandria that the sun is at rest, that the earth rotates about its own axis, and that the earth like other planets circles around the sun. Today we know that he was right, but the time was not ripe for his discovery. Nobody believed him; he was charged with impiety, and the geocentric system of Ptolemy dominated astronomical theories until the time of Copernicus.

Another example which I think illustrates very graphically the importance of the time element in science is to be found in the work of the German anatomist and pathologist Jakob Henle. In 1840 he published a remarkable book on pathological investigations, the first part of which discusses miasmas and contagium and miasmatic-contagious diseases. He demonstrates that miasma is a substance which enters the human body from the outside world and causes disease. The prototype of such a disease is malaria, which is always acquired from outside and not by contact. A contagium on the other hand is produced in the body and is transmitted from one individual to another. The prototype of such a disease is syphilis, which is transmitted by contact. Most other infectious diseases, however, are miasmatic-contagious. An individual acquires a miasma from outside, develops a contagium which then is passed on from one to the other. Such a disease is the plague. One gets it from outside

sial. According to the general plan of the series the editors endeavored to give the best possible text, yet without giving the reader a chance to form his own judgment.

The present situation as far as the text of the Corpus Hippocraticum is concerned is therefore this: whoever wants to study Hippocrates in the Greek original will still have to use the edition of Ilberg and Kühlewein, consulting at the same time the editions of Heiberg and Jones. A few single Hippocratic treatises have been edited separately, and the student of those will of course use these monographic editions.¹³ All the newer editions mentioned so far are incomplete. For a large number of treatises we therefore have still to go back to Littré.

This situation is far from satisfactory. The imminence of the Corpus edition has paralyzed the efforts of prospective Hippocrates editors for many years. But we cannot wait indefinitely, and I wish that the editors of the splendid collection Guillaume Budé would include a complete Hippocrates in their program.

§

An ancient text that is of interest not only to the philologists but also to the historians at large and to the students of other disciplines should always be accompanied by a translation. And who could translate a text better than its editor, who has pondered the weight of every word, reflected about the meaning of every sentence? It is highly regrettable that the Corpus Medicorum Graecorum does not include translations. The cost of printing would have been considerably increased, to be sure, but the sale would have been so much larger that it would easily have compensated the cost. Important books like those of Aëtius of Amida have never been completely translated into any modern language. The wrong conceptions we have of Galen and his work are due chiefly to the fact that, with the exception of a few treatises, Galen's work has not as yet been translated.

The English reader will highly welcome the Loeb Hippocrates for the excellent translation it contains. These four volumes, handy in format,

¹³ Theodor Gomperz, *Die Apologie der Heilkunst*, Leipzig, 1910; F. C. Unger, *Libri Hippocratici de Corde*, Leiden, 1923; *Hippocratis de Aere Aquis Locis*, mit der alten lateinischen Uebersetzung herausgegeben von G. Gundermann, Bonn, 1911; G. Putzger, *Hippocratis Quae Feruntur Epistulae ad Codicum Fidem Recensitae*, Wurzen, 1914; Axel Nelson, *Die Hippokratische Schrift περί τροφῆς*, Uppsala, 1909.

century and which we call the art of the baroque as compared with the classical art of the Renaissance. If one compares a baroque painting, sculpture, or building with classical works of art, one finds significant differences. The painter of the Renaissance painted his figures with clear outlines, well-defined surfaces; his composition was harmonious and well balanced. The baroque artist, on the other hand, saw the world in motion; the outlines of his figures were erased, played upon by light and shadow. He emphasized the diagonal in his compositions; an open window, a distant landscape may catch your eye, and this gave his creation depth and wider perspective. His art was dynamic, not static. The Renaissance artist was interested in what exists, the baroque artist in what happens. There was a definite change from a static to a dynamic outlook, one which we find not only in art, but in music beginning with Caccini, in physics with Galileo, and in the medical sciences with Harvey. He was an anatomist, as we all know, but what fascinated him was motion, and in his hands anatomy became *anatomia animata*. Harvey wrote another book which characteristically enough had embryology for a subject. Embryology also is dynamic anatomy, one that changes from one moment to another.

Every science requires a foundation upon which to build. There could be no scientific physiology without anatomy, and today physiology has to draw heavily from the discoveries made in physics and chemistry. The example of Harvey shows that a scientific movement can only develop in a certain atmosphere. It follows the general trends of the period, and it is perfectly obvious that the social and economic conditions prevailing at that time must have a strong influence on the development of science, acting either as a stimulus and incentive or as a retarding factor. Ancient Greece was a seafaring nation, and as soon as their ships went beyond the Aegean sea some astronomical knowledge was required, which in turn called for mathematics. Throughout history navigation has been a strong stimulus to science. The larger the ships became the further they went, and the more scientific knowledge was required.

Slave economy, on the other hand, was a handicap to science. As long as slave labor was easily available and cheap there was no demand for labor-saving machines. The Greeks knew the principle of the steam engine but never applied it. There was no need for vastly increased industrial production in a society which consisted for the most part of slaves, small farmers, and craftsmen. Handicraft industry was perfectly sufficient to satisfy the needs of a small upper class. The very ingenious

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ordinary to Napoleon, was needed to draw general attention to percussion. In 1808 he published a new edition of Auenbrugger's book with a French translation and a voluminous commentary, and from then on physicians began to practice percussion, in France first, then in England, and finally also in Auenbrugger's home land, Austria, and in Germany. The explanation for this delayed recognition is easy to find. The year 1761 not only saw the publication of Auenbrugger's book but also of Morgagni's great work *De Sedibus et Causis Morborum per Anatomen Indagatis*, a book which was to become the foundation of pathological anatomy. Anatomical thinking was not yet general enough to warrant the acceptance of percussion.

In the seventeenth century Santorio constructed a thermometer to measure the temperature of patients suffering from fever. It was a glass ball that the patient kept in his mouth, connected with a tube on which the temperature could be read. But at that time nobody thought of measuring fever, and for centuries physicians believed that putting the hand on the patient's forehead was enough to determine a sick man's fever, although Boerhaave in the early eighteenth century and de Haen some time later had used the thermometer in their clinics at Leiden and Vienna. The measuring of temperature as a matter of routine became general only in the second half of the nineteenth century. On the other hand, the discovery of the X-ray spread like wildfire. I will give you a few dates for France only, but I am sure they were very similar in other countries. On December 28, 1895, Wilhelm Roentgen announced his discovery. A few weeks later, on February 10, 1896, Charles Henry presented a report on Roentgen's discovery to the French Academy of Science. On April 17 the first French X-ray machines were shown. Before that, on April 1 a clinical demonstration was made before the Société de Chirurgie and on August 6 before the Congrès Français de Médecine.³ Why such a difference in the acceptance of thermometry and of the X-ray? Again the reason is not difficult to find. Little was known about the physiology of fever before the nineteenth century, and it took the physicians some time to think about it in quantitative terms. The use of X-rays for purposes of diagnosis, however, was on the straight line of medical development and was the crowning method which had been preceded by percussion, auscultation, the invention of the ophthalmoscope and of the laryngoscope, by apparatuses that introduced electric bulbs and mirrors into every cavity of the body in an attempt to see anatomical

³ H. Péquignot, "La médecine et le monde moderne," *Les Temps Modernes* 9:773, 1953.

undertaking just before the appearance of the new Corpus edition. One waited therefore. One waited, and nothing was done. To comply with the demand of the medical public, several anthologies were published of rather problematic value.¹⁷ Had they been perfect they wouldn't have given what was really required—a complete German Hippocrates. It was finally realized that, should the present generation obtain the translation it was asking for, one couldn't possibly wait very much longer. Better a Hippocrates with imperfections than none at all. It was good news to hear that the long-sought translation had materialized and would be issued within a few years, although the publisher's announcement does not look very promising.¹⁸

France has its Littré, which has become a classic. The translation has deficiencies but is still a monumental piece of work that will not soon be supplanted. The original Littré was published in ten volumes and, although still obtainable, is becoming quite expensive. To reprint a revised edition of the translation was certainly an excellent idea, and the announcement last year was generally welcomed.

In the meantime two of the announced volumes have appeared.¹⁹ It is hard to recognize the old Littré, dear to all of us. The new edition is apparently not intended for study but as an ornament of the doctor's office. It is printed in the cheap, pretentious pseudobibliophilic manner that became so popular after the war. Professor H. Roger, the venerated Honorary Dean of the Medical Faculty of Paris, wrote a preface and introductions to the different treatises. They are warmly written and entirely unaware of the work that has been done in the field during the last hundred years. The translation has been revised but by no means critically. None of the modern editions of the Greek text have been consulted.

The *clou* of this new Littré, however, is the illustrations. A bibliophilic edition obviously has to be illustrated. After all, it could have been done,

¹⁷ *Hippokrates, Grundsätze seiner Schriftensammlung*, ausgewählt und eingeleitet von Erich Ebstein, Leipzig (n.d.); Arnold Sack, *Hippokrates, eine Auslese seiner Gedanken über den gesunden und kranken Menschen und über die Heilkunst*, Berlin, 1927; Karl Krayl, *Hippokrates Brevier*, Stuttgart, 1929. A translation of *περὶ ἀέρος*, etc., was published under the title *Das Goldene Buch des Hippokrates*, Übersetzung von Gerhard Jacoby, Stuttgart, 1930.

¹⁸ *Die hippokratische Schriftensammlung in neuer deutscher Uebersetzung*, unter Mitwirkung von G. Sticker, herausgegeben von R. Kapferer, 7 volumes (25 parts), Stuttgart, Leipzig.

¹⁹ *Hippocrate, Oeuvres Complètes, Illustrations* de Kuhn-Regnier, préface et commentaires du Professeur Roger, traduction de Littré, Paris, 1932-1933, 2 volumes issued so far [1934].

a few days and the empyema avoided. People suffering from pernicious anemia, diabetes, meningitis, erysipelas, puerperal fever, and many other diseases have good chances for survival today, while they were lost only yesterday. On the other hand, men of my generation had good chances of being killed in two wars. The historical moment, in other words, affects not only scientific developments, but also man's health and illness.

§

Let me make just a few remarks about science as a factor in the molding of history. I shall be brief because the facts are more generally known, and I shall limit myself to the impact of science on society and to a few recent developments in the western world. As long as agriculture was primitive and industry consisted of craftsmen operating on a small scale, little science was needed and applied in the process of production. From the Renaissance onwards, however, scientific thought and scientific discoveries began to exert an ever-increasing influence. The voyages of discovery in the sixteenth century made a deep impression on western society; new continents were found with plants, animals, and races of mankind unknown to the Greeks. The human body was explored by Vesalius and his fellow anatomists, and the universe by Copernicus and his followers. This discovery of the world broadened man's outlook considerably, and it was continued in the eighteenth century by Newton, Galileo, Kepler, and many others. At the same time, Harvey, Descartes, Borelli showed that the human body was some kind of a mechanical system and that mechanical laws applied to it also. The microscope revealed a world of infinitely small living beings. One discovery followed another. In the eighteenth century it was electricity. Chemistry had its great revolution, and the steam engine was invented. The philosophers deeply interested in science became its chief popularizers and propagandists. The French Revolution enthroned reason, and reason is the essence of science.

In the course of the nineteenth century, in Europe first, in America somewhat later, science became a determining factor in history. New industries developed, and industrial output both increased considerably in quantity and improved in quality. The populations of all industrial countries increased because new means of transportation made it possible to bring food from distant regions and the population could grow beyond the capacity of the home soil. At the end of the last and in the beginning

treatises. Max Wellmann²¹ attributes *περὶ ἀρχαίας ἰητρικῆς* (*On Ancient Medicine*) to a Pythagorean physician, follower of Alkmaion. The ἀρχαῖοι ἰατροί, to whom the author refers in his oration (ἐπίδειξις) as the founders of medicine, are the Pythagoreans whom he attempts to defend against the dietetic views of the Cnidian school. In a short note dealing with the same treatise Karl Deichgräber²² succeeded in improving the text by suggesting the reading (cap. 9, p. 41, 21 Heiberg) of τοῦ σώματος τὴν διάξιν instead of τοῦ σώματος τὴν αἰσξιν, a conjecture which seems very good to me.

Two important monographs have been written on *περὶ ἀέρων ὑδάτων τόπων* (*On Airs, Waters, Places*) by two young philologists, Ludwig Edelstein²³ and Hans Diller.²⁴ Diller's is a thorough study on the history of the text, discussing the Greek manuscripts, the Latin translations, the oriental tradition. Galen's commentary on this treatise was lost in the Greek original but preserved in the Hebrew translation. Diller gives a critical edition of the later Latin translation and adds numerous valuable suggestions for the emendation of the Greek text, of which he promises a new critical edition. Further studies on the medical and anthropological content are also to follow.

Edelstein's approach is different. He starts by giving a careful analysis, making evident that the book consists of two entirely different treatises which have no connection whatever, one, cap. 12-24, being a comparative anthropology of Asia and Europe, while the other, cap. 1-11, is considered a prognostic treatise instructing the physician who comes to a region unknown to him how to observe the surroundings and to draw conclusions from them as to the nature of the diseases prevailing in such a place, so that he may know all about the patient right away without asking questions. Edelstein believes that this first treatise is not homogeneous either, but that cap. 7-9, on waters, are interpolated from an otherwise lost treatise, *περὶ ὑδάτων*, a point in which I cannot follow him unrestrictedly.

Edelstein's conception of *περὶ ἀέρων* is highly original, and this first chapter of his book became the starting point for very important investigations on Hippocratic prognostic, the Hippocratic physician, and the

²¹ Max Wellmann, "Die ps-hippokratische Schrift *περὶ ἀρχαίας ἰητρικῆς*," *Archiv für Geschichte der Medizin* 23:299-305, 1930.

²² Karl Deichgräber, "Zu Hippokrates' *περὶ ἀρχαίας ἰητρικῆς*," *Hermes* 68:356-358, 1933.
²³ Ludwig Edelstein, "περὶ ἀέρων und die Sammlung der Hippokratischen Schriften," *Problemata, Forschungen zur klassischen Philologie*, no. 4, Berlin, 1931.

²⁴ Hans Diller, "Die Uebersetzung der Hippokratischen Schrift *περὶ ἀέρων ὑδάτων τόπων*," *Philologus*, Supplementband XXIII, no. III, Leipzig, 1932.

siderably. But we all know how difficult this problem is. Socialism is an attempt to organize the life of a nation in a scientific manner, and we shall have to see how successful it will be.

When, thirty years ago, some of us talked of the social implications of science, nobody listened. In the current textbooks of history, the word science was as a rule not even mentioned. The situation has changed today, and we have many excellent textbooks of all grades which fully recognize the great part played by science in the historical development of the western world. The scientist, on the other hand, is beginning to be aware of his social responsibilities. He is not only an expert but has an important part to play as an expert citizen.

The history of science can teach us a great deal. In our schools science is too frequently taught in a dogmatic way and not presented in its cultural setting. A body of generally accepted knowledge, simplified and carefully digested, is transmitted to students who accept it as a matter of course. The graduate teaching of science trains specialists, highly efficient specialists, who, however, are frequently uneducated outside their specialty. The academic world surrendered so readily to dictatorship in many countries because it consisted of specialists who knew nothing outside the narrow bounds of their special field. If we wish to produce a citizen able to think in terms of science and a scientist prepared to participate in social action, we must improve our methods of teaching. One way, and in my opinion it holds great promise, is to approach the sciences not only technically but also historically, philosophically, and sociologically.

evident from several papers of Richard Koch²⁹ in which he endeavors to interpret the first three *Aphorisms* and reflects about the causes of the fame of the *Aphorisms* in various periods of history.

Since Pétrequin's classical book on Hippocratic surgery³⁰ very little has been done on the surgical writings, just as the gynecological treatises have been utterly neglected. We welcome therefore the study of W. Schleiermacher,³¹ although the results are not particularly exciting. The author examines the composition of *περὶ ἀγμῶν* (*On Fractures*), and *περὶ ἄρθρων* (*On Joints*). Both were not originally independent writings, but parts of one larger surgical book beginning with the words *τάδε ἐξ χειρουργίην κατ' ἡτρεῖον*, while the treatise transmitted under the very inadequate title *κατ' ἡτρεῖον* represents a mere abstract from the original book. The titles *περὶ ἀγμῶν* and *περὶ ἄρθρων* were given to the respective treatises by a late editor (between 200 and 150 B.C.) who edited those sections of the original work separately, more or less preserving the order of the chapters but changing the beginning of *περὶ ἀγμῶν* and the end of *περὶ ἄρθρων*.

It created quite a sensation when W. H. Roscher, in several most fascinating publications,³² declared the treatise *περὶ ἐβδομάδων* to be the oldest document of Ionian philosophy. Roscher's ideas were violently opposed at the time by Diels, Boll, Ilberg, and others. Now, in a recent publication, Max Wellmann,³³ who smells Pythagoreans everywhere and has a mania for ascribing every anonymous treatise to a well-known name, has attributed the treatise to a Pythagorean physician of Cyrene, a follower of Proros of Cyrene and a student of the Cnidian school. Wellmann's arguments are far from convincing, and *περὶ ἐβδομάδων* is still one of the most puzzling writings of the Corpus, one that certainly has to be approached from an entirely different angle.

The pseudo-Hippocratic *Epistles* included in Littre's edition, and re-

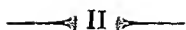
²⁹ Richard Koch, "Auslegung des ersten Hippokratischen Aphorismus," *Historische Studien und Skizzen zur Natur- und Heilwissenschaft*, Festgabe Georg Sticker, Berlin, 1930, pp. 1-10; "Auslegung des zweiten Hippokratischen Aphorismus," *Festschrift Max Neuburger gewidmet*, Wien, 1928, pp. 209-218; "Auslegung des dritten hippokratischen Aphorismus," *Archiv für Geschichte der Medizin* 26:281-288, 1933; "Warum kamen die Hippokratischen Aphorismen zu klassischer Bedeutung?" *Münchener medizinische Wochenschrift* 80:189-191, 1933.

³⁰ *Chirurgie d'Hippocrate*, par J. E. Pétrequin, Paris, 1877-1878, 2 volumes.

³¹ W. Schleiermacher, "Die Komposition der Hippokratischen Schrift *περὶ ἀγμῶν-περὶ ἄρθρων ἐμβολῆς*," *Philologus* 74 (N.F. 38):273-300, 399-429, 1929.

³² *Die Hippokratische Schrift von der Siebenzahl in ihrer vierfachen Ueberlieferung*, zum erstenmal herausgegeben und erläutert von W. H. Roscher, Paderborn, 1913.

³³ Max Wellmann, "Die ps. hippokratische Schrift *Περὶ ἐβδομάδων*," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 4(1):6-10, 1933.



ANCIENT AND MEDIEVAL MEDICINE

paragraph, "I will keep pure and holy both my life and my art," is a positive pledge.

The oath certainly is a great document—its influence, if anything, proves that sufficiently. Yet when we examine it critically, and we have to do so as historians, we will find that utilitarian motives are far from absent. And, after all, what is the ultimate goal? What is the physician seeking for, who keeps his oath loyally? Reputation. "Now if I carry out this oath and break it not, may I gain for ever *reputation* among all men for my life and for my art." The gain of reputation, however, is certainly not the highest ideal we can conceive.

Hippocrates, in the course of the centuries, became the father of medicine, an ideal figure. And yet he and his contemporaries were human, very human, beings. They had to make a living, they sold their services, and the man who worked for money was not highly esteemed in Greek society. We think of the Hippocratic physicians as worthy bearded old gentlemen uttering weighty wisdom, just as we cherish a sentimental picture of the family doctor of old. Bearded they were, the Hippocratics, to be sure, but otherwise we must imagine them as acting very much as the people do today who are living near the Orient. And we know positively that many of them were shrewd fellows.

We are much indebted to Ludwig Edelstein for bringing our views nearer to reality. Being a philologist and not a doctor, he was not burdened by 2500 years of professional tradition and could read the Hippocratic writings much more objectively. I mentioned his book before.²³ Having found that the treatise *On Airs, Waters, Places* had a prognostic character, he naturally became interested in prognosis. Why did Hippocratic medicine emphasize prognosis to such an extent? But before this question could be answered, another had to be raised: what were the conditions of medical practice in Greece?

The Hippocratic physician was a craftsman, was educated as such, and, as a rule, practiced his τέχνη, his craft, while wandering, like other craftsmen—the shoemaker, the blacksmith, the artist. Only larger communities had their permanent municipal physician whose salary was raised through a special tax. In smaller towns medical service was given exclusively by the wandering physicians. When such a doctor came he knocked at the doors, offering his services like other craftsmen, and where he found sufficient work he rented a shop, the *iatreion*, and settled down for a while. The physician, as a rule, was unknown to his patients. There was no license guaranteeing a certain amount of knowl-

ON HIPPOCRATES



ONE hundred years ago, in 1839, the French philologist and philosopher, Emile Littré, disciple of Auguste Comte, began publishing his edition of the *Corpus Hippocraticum*. He worked on it for more than twenty years. In 1861 the tenth volume was finally issued, completing this gigantic task.

This new edition revealed a new attitude towards Hippocrates. Although Littré had studied medicine, and although in his preface he expressed the hope that this new edition would be of profit to the medical profession as well as to historians, his approach to the Hippocratic collection was the critical approach of a philologist and historian.

For more than 2000 years the great figure of Hippocrates, the father of medicine, had inspired the healing art. The works transmitted under his name had been copied and printed over and over again for more than 2000 years. Medicine had progressed during that long period of time. Vesalius, Harvey, Morgagni, and so many others had laid the foundations of a new system of medicine. The Hippocratic books were no longer textbooks. And yet the medical world still venerated them as you venerate your ancestors. The physicians still admired the keen sense of observation of the Hippocratic doctors, their sound judgment in evaluating symptoms of disease, their carefully balanced therapy. One felt a sentimental attachment to Hippocrates. He was still fully alive, so much so that, in the beginning of the nineteenth century, at the reorganized medical school of Paris, a special chair was established for Hippocratic medicine and rare cases.

The French school flourished. The natural sciences developed by leaps and bounds. Scientific medicine made a splendid start and evolved with a

περὶ φροῶν (*On Winds*), a treatise that was generally considered as decidedly pseudo-Hippocratic.

Ludwig Edelstein demonstrated very convincingly—and this is the last chapter of his book²³—that we have no possibility whatever of attributing any definite writing to Hippocrates. We know nothing about Hippocrates' literary activity. To connect him with any treatise is mere guess-work. But then why was the Corpus called the Corpus Hippocraticum? Why were all these treatises attributed even in antiquity to Hippocrates, and not to Herodikos or Euryphon or any other doctor? What was the process?

According to Dr. Edelstein it was this: to his contemporaries Hippocrates was not a particularly outstanding figure. He was a famous physician and teacher of medicine—among many others. Little was known about his life and work; otherwise the references would not be so scarce.

The early Alexandrian physicians became interested in the history of medicine. In a very important testimony of that time (Scholion to Ilias, 11, 515) it is said that dietetics were inaugurated by Herodikos and were brought to perfection by Hippocrates, Praxagoras, and Chrysippus. Herophilus was a student of Praxagoras of Cos, Erasistratus a student of Chrysippus of Cnidos. Hippocrates, Praxagoras, and Chrysippus were mentioned together as the three leading men in the field of dietetics. Hippocrates, however, was the senior of the three.

The Alexandrian library contained many fifth and fourth century medical books which must have been anonymous at the time they were brought to Alexandria. As soon as the interest in Hippocrates was aroused, the Alexandrian physicians and philologists endeavored to ascertain which of the anonymous books could be the work of Hippocrates. In this way a nucleus of Hippocratic writings was formed.²⁴

As time went on, the fame of Hippocrates increased. To Celsus, whose work reproduces late Alexandrian knowledge, he appears not as the man who brought dietetics to perfection but as the oldest medical writer ("vetustissimus auctor"), as the first of all worth being remembered ("primus ex omnibus memoria dignis," I, 18. 12-13). It is obvious that more and more anonymous treatises were now ascribed to him.

This process continued; Hippocrates was more extensively heroized. To imperial Rome, the fifth century B.C. was the Golden Age of Greece,

²³ We know the names of the first editors: see Max Wellmann, "Hippokratesglossare," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 2, 1931.

the results of the German excavations carried out on the island of Cos, hoping that they would throw new light on Hippocrates and his activities. They did not, interesting as they are.³ They proved that, contrary to the traditions, the cult of Asklepios was not brought to Cos before the middle of the fourth century B.C., that is to say, after the death of Hippocrates. The first altar was erected to Asklepios shortly after 350 B.C., and the temple built in the beginning of the third century. All the stories about Hippocrates and his relations with the Asklepieion, therefore, have to be banished into the realm of imagination. And this is probably true of the other stories as well.

The German excavations, however, brought to light more than twenty inscriptions concerning physicians, giving evidence of the flourishing condition of the medical school of Cos in the third and second centuries B.C., and of its relation to the Asklepieion. Rudolf Herzog believes that an inscription that he found should be considered as the sepulchral inscription of Thessalus, son of Hippocrates.⁴

We still know very little about Hippocrates. And yet, like the physicians of imperial Rome, the doctors of our days want to know all about the life of the father of medicine. Where there are no historical sources available, imagination will step in and the poet will replace the historian.

In 1923 Georg Sticker published a German translation of books I and III of the *Epidemics*, with an excellent medical commentary.⁵ In the introduction he traced a picture of Hippocrates. Assuming that all the Hippocratic writings, in spite of all contradictions, were written by the same man—Hippocrates himself—he wrote a kind of fairy tale, charming in its naïveté, but having nothing whatever to do with Hippocrates.

The same is true of another much more pretentious publication. It is rare to find an inaugural dissertation on a best-seller's list. And yet this happened in the case of Gaston Baissette's *Hippocrate*.⁶ It was translated into German,⁷ into Italian (1933), and an English translation probably

³ R. Herzog, *Heilige Gesetze von Kos*, Abhandlungen der Preussischen Akademie der Wissenschaften, Phil.-Hist. Klasse, nr. 6, 1928; *Wunderheilungen von Epidauros*, Leipzig, 1931; *Kos*, vol. I, Berlin, 1932. These very important books will be reviewed in a later article on medical archeology.

⁴ "Die Grabschrift des Thessalos von Kos," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 3(4):54-58, 1933.

⁵ Hippokrates, *Der Volkskrankheiten erstes und drittes Buch* (um das Jahr 454-430 v. Chr.), aus dem Griechischen übersetzt, eingeleitet und erläutert, Klassiker der Medizin, vol. 28, Leipzig, 1923.

⁶ Paris, 1931, Bernard Grasset.

⁷ *Leben und Lehre des Hippokrates*, Stuttgart, Leipzig, 1932.

hand. The parallelism between the two studies is striking. Edelstein's starting point was the treatise *On Airs, Waters, Places*. From there he discussed the whole set of problems. Deichgräber started with the *Epidemics* and was also induced to deal with the general problems of the Corpus. The results are very contradictory.

Deichgräber aimed at what the students of Hippocrates had done for centuries, namely, at a grouping of the different writings, attributing them to definite periods, schools, and eventually to individuals. The result of the first part of his study is that *Epidemics* I and III, which had always been recognized as belonging together, were written at about 410 and that the *Prognostikon* belongs to this group. A second group includes *Epidemics* II, IV, and VII, written between 399 and 395, *περὶ χυμῶν* (*Humors*), and the surgical treatises (*κατ' ἰητροῦ, μοχλικόν, περὶ ἀγμῶν-περὶ ἄρθρων*). Both groups are very close to each other, and related to these groups are the systematic treatise of Polybos *περὶ φύσεως ἀνθρώπου* (*Nature of Man*), then *περὶ ἀέρων ὑδάτων τόπων* (*Airs, Waters, Places*) and *περὶ ἐσχῆς νούσου* (*Epilepsy*), the latter too being the work of one author. A third, later, group finally is represented by *Epidemics* V and VII, a collection of notes written at about 360. While in the other books of *Epidemics* the prognostic interest is prevalent, books V and VII are chiefly therapeutic in purpose.

In the second part of his study, Deichgräber then examines the traditions on Hippocrates and his disciples, endeavoring to connect the men with the writings. Although he cannot definitely attribute any treatise to Hippocrates, he still strongly believes that the first group mentioned above is the work of Hippocrates himself, and that the second group was at least strongly under his influence.

Deichgräber's monograph is a piece of thorough scholarship. Yet I must confess that it didn't convince me. The interpretation seems to me arbitrary and farfetched in many points. Data in the biography of Soranus are accepted as historical when they fit into the picture; otherwise they are rejected as legendary. The interpretation of the *Anonymus Londinensis* is a *tour de force* of philological acrobaticism. All in all, Deichgräber has brought the approach to the problem back to where it was at the time of Littré.

Dr. Edelstein, at the present time, is writing the article on Hippocrates for the *Realenzyklopädie* of Pauly-Wissowa, and we are anxious to see what he will have to say to the recent publications.

In the second century A.D. Hippocrates was the generally recognized

One recognized that besides the manuscripts an extremely important source for the reconstruction of the text was to be found in the commentaries that Galen wrote to many Hippocratic treatises. The oldest manuscripts of Hippocrates that we have were written in the tenth century A.D. We do not know how old the manuscripts were that Galen used, but in any case they were 800 years older than ours, and therefore much nearer to the originals, so that Galen's text had to be considered very carefully.

But here enormous difficulties had to be overcome, because there was no critical edition of Galen which one could build upon. We are still using Kühn's edition,¹⁰ which is anything but critical and even worse than some of the Renaissance prints. Hence, before one could approach Hippocrates, one had to establish the text of Galen's commentaries by studying all the manuscripts of Galen. It was an extremely wearisome task. Some commentaries were preserved only in Arabic translations, and these, of course, had to be edited also. The work took more than twenty-five years and is still going on.

Finally, in 1927, a first volume of Hippocrates was published in the *Corpus Medicorum Graecorum*.¹¹ It was to be the last word in Hippocratic *Text-Kritik*, but it met with general disapproval among philologists. One important manuscript had not been consulted. The emending hand, the genial approach required of the editor of such a text, were missed. Heiberg was a brilliant scholar who did splendid work in the field of Greek science and medicine. But he was old and sick while he worked on Hippocrates. He died soon after the publication of the book. The volume was a failure. There are rumors that it will be destroyed and redone. God only knows when the *Corpus* will produce its Hippocrates.

In the meantime, the Loeb Classical Library issued a Hippocrates in four volumes.¹² It is also a critical edition. The text was revised and improved in some points by so able a philologist as W. H. S. Jones. The weak point of this edition is the absence of an *apparatus criticus*. The various readings of the manuscripts and the conjectures of former editors are indicated only occasionally when a passage is particularly controver-

¹⁰ *Claudii Galeni Opera Omnia*, ed. C. G. Kuhn, Leipzig, 1821-1833, 22 volumes.

¹¹ *Hippocrates*, ed. I. L. Heiberg, *Corpus Medicorum Graecorum*, vol. I, I, Leipzig and Berlin, 1927.

¹² *Hippocrates*, with an English translation by W. H. S. Jones (vol. III by E. T. Withington), London, New York, 1923-1931, 4 volumes.

will never be able to carry his investigations over a certain limit. He will always reach the point where the medical man has to step in, with his knowledge of disease and medicine as a whole. Ridiculous mistakes have been made by philologists through ignorance of the medical facts. Only the physician will be able to decide what diseases were observed, how correctly they were seen, what the underlying facts of a theory were, what a therapeutic procedure was worth.

The medical man engaged in such studies, on the other hand, must have some philological knowledge. He must be able to read the original text in the best available edition, must know all about the philological work done before. He must build upon it and continue it. He will have to avoid one mistake that is so often made, namely, to call progressive what is in accordance with our present day views and to discard as primitive what is different.

A good example of a study belonging to this group is Georg Sticker's paper on fever and inflammation in the Hippocratic writings.⁴² Temkin's "Epilepsy," mentioned before,²⁷ has to be remembered here too. This is a particularly good example for a very happy combination of philological and medical analysis. Here is a wide field open to investigation. A great deal of work has still to be done on the diseases described in the *Corpus Hippocraticum*, on the therapy of the Hippocratics. A critical study on Hippocratic dietetics would be extremely welcome.

Two monographs have to be mentioned in this connection, although they are not medical, and although they deal only occasionally with Hippocrates. Both, however, are of great interest to the student of Hippocrates. One is a study on the conception, ideals, and methods of science among the ancient Greeks by William Arthur Heidel.⁴³ The chief criticism I have is that it does not sufficiently consider the work done on the subject since 1914. The other book is similar in purpose: a study on the development of the research methods of ancient biology by G. Senn.⁴⁴ Professor Senn is a biologist who has done a great deal of research on Theophrastus and has devoted two very interesting papers to the experi-

⁴² Georg Sticker, "Fieber und Entzündung bei den Hippokratikern," *Archiv für Geschichte der Medizin* 20:150-170, 1928; 22:313-343, 361-381, 1929.

⁴³ William Arthur Heidel, *The Heroic Age of Science*, Carnegie Institution of Washington, Publication No. 442, Baltimore, 1933.

⁴⁴ G. Senn, *Die Entwicklung der biologischen Forschungsmethode in der Antike und ihre grundsätzliche Förderung durch Theophrast von Eresos*, Veröffentlichungen der Schweizerischen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften, VIII, Aarau, 1933.

This Neo-Hippocratism is a distinctly romantic movement. And it is not by accident that it is located chiefly in Germany and Italy, in those two countries in which state and society are built upon the foundation of an irrational mystical philosophy.

§

Two medical journals today are published under the title *Hippocrates*; one is German, the other French. They are very different in character.

The German journal was launched in 1928.⁵¹ I was one of the co-editors of the first volumes, so that I am pretty familiar with its history. The idea was to create an independent medical journal, an open forum for medical discussions. There was a great deal of unrest in postwar German medicine. At the same time, powerful medical bodies and certain big publishing firms endeavored to suppress certain trends. Psychoanalysis was banned. A homeopath could not have a paper printed outside his own periodicals. The new journal published with Hippocrates as patron saint was to be open to every honest worker, regardless of his creed, willing and able to contribute to the advancement of medicine.

The new journal was started with great enthusiasm but soon proved to be a failure. Many papers published were insignificant; others were printed that were not worth the ink wasted on them; the really good and valuable contributions would have had much more influence had they been published in any of the weekly journals. The editor, Georg Honigmann, died in 1931 and the publication was interrupted until 1933. Today *Hippocrates* is a small, provincial, sectarian journal.

The French *Hippocrate* began its career in March, 1933.⁵² It is called a *Revue d'Humanisme Médical*, and is edited by Dr. Laignel-Lavastine, Professor of Medical History at the Paris Faculty. It is not a scholarly journal and does not pretend to be. The idea is to keep the doctor in touch with what is going on in the various fields of arts and sciences. The articles published deal with medical history, general history, history of art and literature. They are never profound but usually interesting. Each number publishes "chroniques," surveys of the different fields, and book reviews. The reader in this way hears what is being done in philosophy, psychology, biology, poetry, music, etc.

⁵¹ *Hippokrates, Zeitschrift für Einheitsbestrebungen der Gegenwartsmedizin*. The present title is *Hippokrates, Zeitschrift für praktische Medizin, Organ für Einheitsbestrebungen in der Medizin*, Hippokrates-Verlag, Stuttgart, Leipzig.

⁵² *Hippocrate, Revue d'Humanisme Médical*, Paris, 15, Rue du Sommerard.

handsomely printed, and well presented, ought to be in the library of every medical man. But just because such excellent work was done, I deplore the more that only parts of the Corpus Hippocraticum have been included in this edition. The treatises omitted, of which the more important are the *Epidemics* II, IV-VII, the four books on diseases, and the gynecological writings, may be of less value, but the student of medical history cannot overlook them. They may not be of Coan origin, but they are important documents of Greek medicine as well as the others.

This omission is particularly serious because the translation of Francis Adams,¹⁴ the only other translation available to English readers, is also not complete. Adams translated only those works which he considered genuine. Large and certainly not unimportant parts of the Hippocratic collection therefore are not available in the English language, and this gap is strongly felt by all those who are teaching medical history to medical students and are endeavoring to have them read the sources at least in English translations.

I wish that the editors of the Loeb Classical Library would reconsider their decision. Two more volumes would complete the work and make an excellent job still better. A more detailed index would also greatly improve the usefulness of a translation which is often consulted for reference by medical students.

A good German translation of Hippocrates has also been wanted for a long time. There are a few old translations that are not so bad, the best of them being probably the one by Grimm.¹⁵ It is difficult to find today and, of course, is obsolete in many respects. A more recent attempt was not very successful.¹⁶ The translator, Robert Fuchs, a philologist, had the unfortunate idea of translating the ancient text into a modern pseudomedical technical language which he hardly understood himself. Concepts of modern medicine were smuggled into the ancient writings, and the result was an entirely disfigured picture.

And yet in postwar German medicine Hippocrates was in great favor for reasons that we will discuss in the last paragraph. A new translation was badly wanted by the medical profession and was considered very seriously several times. However, it seemed frivolous to start such an

¹⁴ *The Genuine Works of Hippocrates*, translated from the Greek with a preliminary discourse and annotations by Francis Adams, London, 1849, 2 volumes, New York, 1929.

¹⁵ *Hippocrates, Werke*, Übersetzung von J. F. C. Grimm, Glogau, 1837-1839, 2 volumes.

¹⁶ *Hippocrates, Sämtliche Werke*, Übersetzung von Robert Fuchs, München, 1895-1900, 5 volumes.

MEDIEVAL MEDICINE



WE can approach the medical history of a period from different points of view, from that of practical achievements or from that of ideas. Medicine is a craft and a science. As a craft it is frequently transmitted by word of mouth and practical instruction, from father to son and from master to pupil. As a science medicine is one aspect of the general culture of a period. It reflects man's attitude toward nature, toward the phenomena of life and death. It is expressed in literary form, and the medical books represent one aspect of the literature of a period sharing its general style. We may be more interested in the health conditions and health hazards of a period and in the treatments and diets applied to cure disease or to prevent it. Or we may be more attracted by the ideas that guided the physicians' actions. In the following brief sketch of medieval medicine I shall not be able to discuss its practical attainments in a more than cursory way. Rather I will try to determine the place of medieval medicine in the history of civilization.

Our symposium has a serious gap in that it jumps from ancient Egyptian to medieval medicine and has omitted a discussion of Greek medicine. And yet it was Greek experience and Greek thought that constituted the basic content of medieval medicine. Greek medicine was transmitted to the medieval world and was gradually assimilated by it. A synthesis of rare harmony was achieved between Greek and medieval views until, in the Renaissance, the western world revolted against traditions. Let us examine this process.

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¹⁶ *Hippocrates, Sämmtliche Werke*, Übersetzung von Robert Fuchs, München, 1895-1900, 3 volumes.

intellectual centers but they found in addition the chief Greek medical literature already translated into a Semitic language. Books were the source of knowledge, and the delivery of books, particularly of alchemical and medical books, was more than once made a condition of peace treaties with the Byzantine empire. Once a book was available in Syriac version, it was an easy matter to have it translated into Arabic. After this was done, the book could be read and used by all who needed it from the Pyrenees to India.

In the second half of the eighth and throughout the ninth century an endless number of Greek books were translated in this way: the works of Galen and his successors, but also Hippocratic writings and the *Materia Medica* of Dioscorides, the latter gorgeously illustrated and a book that is still consulted in the Orient today. The chief "transmitter" was Hunayn ibn Isliaq, who was head of a regular school of translators in Baghdad at the court of the Abbasid caliphs. He was assisted by his son Isliaq and his nephew Hubaysh, and tradition attributes to him over ninety pupils. Most of these translators were Christian scholars. They were the linguists of the day, mastering Greek, Syriac, Arabic, and often Persian. They usually first translated a book into Syriac for the use of their fellow Christians, then into Arabic for the use of Muslims. Just as the Ptolemies in the third century B.C. had sent out regular expeditions in search of Greek manuscripts for the Alexandrian library, so did the Abbasid caliphs for the library in Baghdad.

At the end of the ninth century the Arabic-speaking world was in full possession of the Greek medical tradition. It was a medical science that had lost its momentum and had completed its course. It was, moreover, the science of another people, different in race and outlook. Nevertheless, it was the accumulated experience of centuries of observation and reasoning, innumerable facts about diseases and their treatment, that became available to the Islamic world in this way.

Developments were similar and yet different in the West. There too it was hunger that drove barbaric tribes into the fertile fields of the Roman Empire and started a migration of nations. The Germanic people that settled in the western part of the Roman Empire had just as primitive medical knowledge as the Bedouins of Arabia. They too all of a sudden came in touch with a much higher civilization. In the East the Arabs went on their conquest with a new religion that was gradually adopted by the subjugated nations. With their religion they took over the conqueror's language, at least as a literary language. In the West the process

by reproducing the well-known illustrations of Apollonius of Kition, vase paintings, and what not. The publishers have preferred to have new illustrations especially made for the purpose, and the artist created a series of colored pictures that would do honor to the *Vie Parisienne*, a display of Greek chorus girls, darlings generously exhibiting their buttocks and other charms. The pictures are very well done, and as an album would meet with great popularity among hospital internes. Illustrating the father of medicine, they are a disgrace and show a lack of respect towards Hippocrates, Littré, and medical history at large that cannot but be deplored.

I would strongly advise all those who haven't got a copy of the old Littré to secure one for themselves. The old, the real Littré was published by J. B. Baillière et Fils, 19 rue Hautefeuille, Paris, on ordinary paper—and is not illustrated.

§

We do not know which, if any, parts of the Corpus Hippocraticum were written by Hippocrates himself. Who then were the authors? What is the content of the collection? What were the concepts of the Hippocratic physicians, what their practical achievements? What diseases were they fighting?

These and many other intricate problems have preoccupied the Hippocrates students since the days of Alexandria. There are two main approaches to the subject: philological and medical. Before we can discuss the medical content of the different treatises we have to study them as literary documents of a definite period of Greek literature, deeply rooted in their soil, and we have to apply to them all the methods of literary criticism.

The entire Hippocratic collection is written in the Ionian dialect, but it is obvious that there must be grammatical and stylistic distinctions among writings originating in various sources. By analyzing the style of different treatises, it should be possible to establish certain groups. Much work has been done on that line, and more recently Margit Gutmann has written a dissertation on the dependent clauses in selected Hippocratic writings and their importance for the problem of authorship.²⁰

Numerous papers are devoted to the critical examination of single

²⁰ Margit Gutmann, *Die Nebensätze in ausgewählten Schriften des hippokratischen Corpus und ihre Bedeutung für die Verfasserfrage*, Inaug.-Dissertation, München, 1929.

of the western world in the early Middle Ages. Around 900 the Arabs were in full possession of the Greek medical tradition. In the West some works of Hippocrates and Galen, the *materia medica* of Dioscorides, Soranus, and some other great writers were translated as early as the sixth century, but around 900 they were almost forgotten. The popular literature consisted of short treatises compiled for practical purposes in Greek in the fourth century mostly, translated into Latin in the sixth century. They were translated into Syriac, Arabic, and Hebrew also, but were superseded by better literature. In the West, however, these short treatises dealing with urine, pulse, fever, diets, prognostic, bloodletting, and pharmacology constituted the bulk of ancient literature that was still alive in Carolingian days.

Dioscorides, the chief source of ancient *materia medica*, was translated three times in the early Middle Ages, but of one version we have only an indirect testimony. A second version is preserved only in short fragments, and of the third only two manuscripts have survived, while we still have over fifty manuscripts of the herbal of Pseudo-Apuleius. This shows how infinitely more popular this very inferior treatise was. The prognostic of Hippocrates was translated twice, but both versions are known only in short fragments, while there are many manuscripts of the so-called *Prognostica Democriti*.

In 732 the Arabs were repulsed from France, but they remained in Spain until 1492. They conquered Sicily in 827 and ruled the island until the end of the eleventh century. From the eleventh to the thirteenth century East and West clashed in the crusades. Intercourse between the two civilizations became very close. Different as they were, they had a great deal in common due to their common heritage. Not only commercial but also intellectual relations increased, and, since the Arabs were more advanced in science and medicine, Europe began to learn from them.

In the eleventh century, Constantine, an African by birth and therefore a master in eastern languages, traveled all over the Orient and came to Monte Cassino where he became a monk, bringing with him Arabic medical books that he translated into Latin. He thus greatly enriched western literature and made Greek and Arabic writers available that had not been known before.

Toledo, one of the chief centers and the western outpost of Arabic learning, was conquered by Alfonso VI of Castile in 1085, but it maintained its position under Christian rule. It thus became the center from which eastern knowledge was transmitted to the West. In Toledo in the

Hippocratic question as a whole, to which I will have to return in the next paragraph.

Geographic observations and conceptions in the Hippocratic collections are the subject of a dissertation by Gerhard Jacoby.²⁵

The famous treatise *περὶ ἐπιληΐδος νοσήσου* (*On Epilepsy*) has recently been the subject of two papers. Max Wellman²⁶ attributes the treatise to a physician who belonged to the school of Kroton, or to the Old Cnidian school, which was very closely connected with Kroton. The author, according to Wellmann, was a follower of Alkmaion, who reproduced his master's views on the physiology of the brain. He wrote this treatise in his youth, and later, after having traveled all over the world, wrote *περὶ ἀέρος*. In opposition to Wilamowitz and Regenbogen, Wellmann assumes that the chapters 14-17 are not interpolated but are an integral part of the book, a conclusion that was shared by Owsei Temkin.²⁷ Temkin gives a very thorough philological and medical analysis of the treatise and shows that it was written by a physician for laymen. The purpose was to enlighten people as to the nature of epilepsy, to demonstrate that this disease was not more sacred than any other disease, that it was curable by drugs and especially by diet, but that the treatment had to begin early. Temkin did not restrict himself to this one treatise but examined all passages of the *Corpus* on epilepsy and in this way succeeded in giving a comprehensive picture of what the Hippocratic physicians knew and thought about the disease—what they called it and how they treated it.

Among the many Hippocratic writings, the *Aphorisms* undoubtedly became by far the most popular books; printed, translated, and commented upon endless times, they were the doctor's bible for many centuries and often referred to by the laymen. But this popularity was acquired relatively late. Ernst Nachmansohn²⁸ searched the nonmedical ancient literature for references to the *Aphorisms* and found remarkably little.

That the *Aphorisms* still have a strong appeal to the philosophically minded physician, that they still provide food for reflection, becomes

²⁵ Gerhard Jacoby, *Geographische Beobachtungen und Anschauungen im Corpus Hippocraticum*, Inaug.-Dissertation, Jena, 1928.

²⁶ Max Wellmann, "Die Schrift *περὶ ἐπιληΐδος νοσήσου* des Corpus Hippocraticum," *Archiv für Geschichte der Medizin* 22: 290-312, 1929.

²⁷ Owsei Temkin, "The Doctrine of Epilepsy in the Hippocratic Writings," *Bulletin of the Institute of the History of Medicine (The Johns Hopkins University)* 1:277-322, 1933.

²⁸ Ernst Nachmansohn, "Zum Nachleben der Aphorismen," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 4(1):92-107, 1933.

natural process not essentially different from physiological processes. It taught further that the human body has a natural healing power which tends to overcome lesions and to restore the lost balance of health, that all actions of the physician must therefore be directed toward aiding this *vis medicatrix naturae*. The Greek tradition taken as a whole, regardless of doctrines, taught how to approach a sick man, what questions he should be asked, how to examine him, and how his symptoms must be evaluated so as to know what fate has in store for him. Greek medical literature of all periods was full of unsurpassed descriptions of disease symptoms and disease pictures. And it contained a wealth of information concerning the treatment of diseases—dietetic, pharmacological, physical, and surgical—the result of centuries of experience. Once this knowledge was assimilated medicine could advance. And it did, in the East and in the West.

The tenth and eleventh centuries were the golden age of Arabic medicine. The leading physicians were no longer Christians but Muslims. They came from all parts of the empire, many of them from Persia. Hospitals were built in increasing numbers from the ninth century on. They were not poorhouses or almshouses like the western hospitals of that period. They were places where sick people were treated, where physicians gathered experience and instructed students.

The number of Arabic-writing physicians who enriched medical knowledge is large. Many of their writings are lost or still buried in manuscripts. Let me mention only a few names and a few contributions. Al-Razi (Rhazes), probably the greatest Muslim clinician, was an extremely versatile scholar, physician, scientist, philosopher, and theologian. We admire him not so much for his *Continens*, an encyclopedic textbook of medicine, as for his case histories, monographs, and short treatises in which he established new disease entities. Most famous is his book *On Smallpox and Measles*, remarkable also his treatise *On Stone in Bladder and Kidneys*. Many more are still unpublished. Rhazes' medical doctrine was Greek, to be sure, but by applying Greek methods of clinical observation and research he enriched medicine considerably.

Another distinguished clinician of the period was Ali ibn el-Abbas (Haly Abbas), like Rhazes a Persian. He too wrote a comprehensive textbook of medicine which is full of valuable observations and reflections. He took a critical attitude toward his predecessors, Greek and Arabic, and accepted from them what he considered true.

All sections of the empire contributed to the golden age of Arabic

edited by Putzger,³⁴ are interesting documents of the Hippocrates legend. The Codex Urbinas 68 contains as epistle 19 an otherwise unknown λόγος περὶ λύσσης (*Treatise on Rabies*) which H. Diels believed to be part of the epistle περὶ μανίης. H. Diller,³⁵ examining the text, came to the conclusion that the addition of Codex Urbinas is not ancient at all but the work of a humanist imitating the Hippocratic style.

§

Another set of problems is attacked as soon as we begin examining the so-called Hippocratic oath, and the other deontological writings, the problems concerning the medical profession in Hippocratic time.

Karl Deichgräber wrote a very illuminating paper on the ethical conceptions in the Hippocratic oath.³⁶ He starts by giving an excellent new German translation of this undoubtedly very old document and then proceeds to analyze it. The first part of the document following the invocation to the gods is an indenture, a contract between master and pupil. In ancient times medicine was a sacred lore of certain families transmitted only from father to son. As time went on, students from outside the family were admitted. What the first part of the oath, however, teaches us is that these outside students were, so to speak, adopted into the family. They assumed all the rights and duties of family members. While the first part of the oath is the result of peculiar historical conditions, the second part postulated the general duties of the physician towards society. Some of these duties are in accordance with the general ethical conceptions of contemporary Greek society. The physician who faithfully complies with them will increase his reputation (δόξα) and will strengthen the public's confidence in the profession. Some of these duties, however, according to Deichgräber, require much more of the physician than would be expected from an average citizen and professional man. Yet we must not overlook the fact that with one exception all these regulations are mere prohibitions. They do not state what the physician ought to do in order to be a good doctor, but they indicate the actions from which the physician should abstain, what δέκη forbids. Only one

³⁴ G. Putzger, *Hippocratis Quae Feruntur Epistulae ad Codicum Fidem Recensitae*, Wurzen, 1914.

³⁵ H. Diller, "Die sogenannte zweite Fassung des 19. Hippokratesbriefes," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 3 (4):35-44, 1933.

³⁶ Karl Deichgräber, "Die ärztliche Standesethik des hippokratischen Eides," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin) 3 (2):29-49, 1932.

1240 set definite standards for the practice of medicine by requiring a prescribed curriculum of nine years, examination by the Salernitan masters in the presence of a representative of the state, and by licensing the medical profession. This gave it a status it had not had before.

When Gerard of Cremona and his group were at work in Toledo, another medical school had come into existence not far from Spain, in Montpellier. Just as Salerno had profited by the first wave of translations, Montpellier did by the second. The interpretation and assimilation of this new literature became one of the chief tasks of the young western universities.

If we wish to watch the medieval physician at work, we must not only consult the textbooks. Textbooks, even in our days, always have to a certain extent the character of compilations, since no man's original researches can cover an entire field. We must read the *Consilia*, missives in which a doctor discussed a definite case. Or we must watch him fighting epidemics. When the black death ravaged Europe in 1348, the physicians had to face a problem for which ancient medicine did not give any solution. Or we must look at the surgeon operating on a soldier after a battle.

When we do this, we soon find that Western medicine too had absorbed the Greek tradition and was enriching it by many important observations.

§

So far we have spoken of the transmission of Greek medicine and its assimilation and enrichment by medieval physicians. Was this all? Was medieval medicine nothing else but a reminiscence of ancient Greece, a belated outgrowth of Hellenistic medicine? Is it possible for a civilization that is alive to take over ideas and systems which are deeply rooted in another civilization without modifying them? The Middle Ages, in the East and West, produced new forms of expression in the social and economic life, in government, law, theology, art, and literature. Is it conceivable that they could have left medicine without their imprint? In other words, is there such a thing as an essentially medieval medicine?

Of course there is. A synthesis was accomplished in this field also. So far, little research has been done on the subject and all I can do is to show where this synthesis is to be found.

A work like the *Canon* of Avicenna could not have been written in

edge. Everybody could call himself a physician and take care of patients for money. For a doctor who came to a town as a stranger, the best and shortest way to acquire a reputation and to gain the confidence of the people undoubtedly was to make correct prognoses. This the patient and his family could check. A physician who could tell right away what was wrong with a patient, and what would happen to him, could not but impress the people if his prognosis proved to be true. These peculiar conditions of medical practice in ancient Greece would explain, according to Edelstein, the central position held by prognosis in Hippocratic medicine.

I think that there are other reasons besides this, which have to be sought in the structure of Greek medicine, in the Hippocratic concept of disease. Nevertheless, Dr. Edelstein has advanced our knowledge tremendously, and we will have to reconcile ourselves to the fact that the Hippocratic physicians were no demigods but just humble mortals, seeking the truth, erring, rejoicing, and suffering like ourselves.

§

In antiquity it had already been noted that the different treatises of the Corpus Hippocraticum could not possibly have been written by one man. They were found to be different in style and concept, sometimes even antagonistic. The question, therefore, was, which are the "genuine works of Hippocrates," and which the pseudo-Hippocratic? As was said before, it was relatively easy to delineate certain groups of writings. There were definite indications as to which treatises had originated in the school of Cnidos. Those opposing them in all probability had to be Coan. One treatise bore the mark of origin in its title, the *Coan Prognoses*. Hippocrates being a Coan naturally had to be connected with this group. It became customary to attribute to Hippocrates those Coan treatises which seemed the best, which appealed most to the medical man. They were considered the "genuine works," while the minor writings had to be the work of pupils.

A real blow was the discovery of the so-called *Anonymus Londinensis*,²⁷ a collection of medical abstracts compiled by a pupil of Aristotle, Menon, who attributed views to Hippocrates similar to those found in

²⁷ *Anonymi Londinensis ex Aristotelis Iatricis Menoniis*, ed. H. Diels, *Supplementum Aristotelicum* 111, 1, Berlin, 1893. There is a German translation of it by Heinrich Beckh and Franz Spät, "Anonymus Londinensis, Auszüge eines Unbekannten aus Aristoteles-Menons," *Handbuch der Medizin und aus Werken anderer älterer Aerzte*, Berlin, 1896.

remained medieval to our days, except in the few sections that have recently adopted features of western civilization.

Matters were different in the West, and the Renaissance marked the turning point. It is a matter of speculation to determine what forces created that great and deep movement. I shall not attempt to discuss the problem in this brief paper. There was a primitive accumulation of capital in the East just as much as in the West, perhaps even more, but it was Europe that developed a capitalist economy. Great voyages of discovery were undertaken by the Arabs long before Europe was thinking of a sea route to India, but the European voyages had a much more profound influence. They affected Western economy deeply and became a stirring experience.

One of the essential traits of the Renaissance was its attitude of revolt against the traditional authorities. The most powerful medieval authority, the church, was attacked and "reformed." The power of the craftsmen's guilds was broken by the developing industry. The authority of the medical faculties was opposed, and their power to regulate the practice of medicine was gradually taken over by other agencies.

Throughout the Middle Ages the Greek medical tradition was accepted as authoritative. It was open to interpretation, to be sure, but its authority was hardly ever questioned. Now physicians wrote books *De Plinii et Aliorum Medicorum Erroribus*. This revolt against tradition was sometimes dramatic, as in the case of Paracelsus. It was usually less spectacular but was a revolt nevertheless, and it paved the way to a new medical science.

the time of the great classics, and Hippocrates was one of them. Erotianus considered him a writer ranking with Homer. He represented Galen's ideal of a physician.³⁹ He now was the father of medicine, and the entire medical literature of the Golden Ages was naturally attributed to him, although more critical minds had their doubts as to the genuineness of some of the treatises.

Edelstein's conception is a hypothesis, to be sure. There can be no certainty when the material is so scant, but to me it is the most illuminating hypothesis on the subject ever professed, and I consider Edelstein's book the most important contribution to the Hippocratic problem since the time of Littré.

Edelstein's book naturally met with great opposition. What he had said was so bewilderingly new, so much out of the traditional line, that it required a considerable effort of thinking on the part of philologists as well as medical men. I shall always remember the evening in 1930 when Dr. Edelstein delivered a lecture on his investigations at the Leipzig Institute of the History of Medicine. He spoke for two hours, without manuscript, without a single note. The entire audience was entranced. The youngest student felt that he had heard a very unusual talk, and old philologists present at the meeting paid their tribute to their young colleague. Later, however, after the publication of the book, the attacks came. The reviews were uneasy and skeptical. The medical reviewers saw an iconoclast in Edelstein. The philologists, fearing that they would have to revise their theories, expressed their disapproval in general terms and attacked him on minor points.

Whoever wrote on Hippocrates in Germany from 1931 on had to consider Edelstein's work. The most important contribution from the other camp was issued a few months ago, a large monograph of Karl Deichgräber's, on the *Epidemics* and the *Corpus Hippocraticum*, a preliminary study to a history of the medical school of Cos.⁴⁰ It is very easy to review Edelstein's book, as it is written in a style as clear as crystal, but it is difficult to give an adequate picture of Deichgräber's study in a few lines. It is written in philological German and has to be read with the texts in

³⁹ See Ernst Wenkebach, "Der hippokratische Arzt als das Ideal Galens, Neue Textgestaltung seiner Schrift 'On ὁ ἑρσιος ἰατρὸς καὶ φιλόσοφος,'" *Quellen und Studien zur Geschichte der Medizin und der Naturwissenschaften* (Berlin) 3 (4):155-175, 1933. See also Hans Diller, "Zur Hippokratesauffassung des Galen," *Hermes* 68:167-181, 1933.

⁴⁰ Karl Deichgräber, *Die Epidemien und das Corpus Hippocraticum, Voruntersuchungen zu einer Geschichte der kaischen Ärzteschule*, Abhandlungen der Preussischen Akademie der Wissenschaften, Jahrgang 1933, Phil.-Hist. Klasse, nr. 3, Berlin, 1933, 172 pp.

against such trickery, and it may be pardonable that they were instructed how to fight back, even if such behavior may not seem very ethical. Patients then as today expected their doctors to be omniscient and—at that time—some physicians thought that they had to live up to these expectations and pretend to know more than they actually did.

Kurt Sprengel in his *Versuch einer pragmatischen Geschichte der Arzneykunde* attacked Arnald violently.⁵ Speaking of this treatise he said: "Particularly interesting are his instructions concerning uroscopy which are so obviously the work of a crook that with Petrarca we can only bewail the destiny of the times when for centuries the noblest art was in the hands of such unworthy clowns."

Hauréau in the *Histoire Littéraire de la France*⁶ accepted Arnald's authorship without moralizing comments, and Lalande even warmly defended Arnald's views, while as early as 1847 A.W.E. Th. Henschel, the learned editor of the old *Janus*,⁷ expressed highest indignation at the idea that such a quack treatise should have been attributed to so great a man and he "solemnly protested against any conclusion that Sprengel had drawn against Arnald from this miserable smear tract."⁸

Yet the problem is not a moral but a literary one. Medieval physicians and surgeons held views that were in many ways different from ours, and Paul Diepgen, to whom we owe the most profound studies on Arnald, made it quite clear that he was very ambitious, a publicity seeker, a politician in the evil sense of the word, "that he had not a straight-forward nature and that he was not meticulous in the choice of the means he used. A lie meant nothing to him. Extreme exaggerations were frequent with him but he was not always conscious of his insincerity."⁹ This is not a flattering picture, and from a moral point of view there is no reason why Arnald should not at some time or other¹⁰ have jotted down the precepts of this little treatise.

A literary analysis, however, reveals immediately that the treatise cannot have been written by one man. The style and whole tenor change

⁵ Part II, ed. 3, Halle, 1823, p. 624.

⁶ Vol. 28, pp. 68-69, Paris, 1881.

⁷ *Janus, Zeitschrift für Geschichte und Literatur der Medizin*. Volume 1 was published in 1846.

⁸ "aus diesem Jammerlichen Sudelwerke," *Janus* 2:543, 1847.

⁹ *Archiv für Geschichte der Medizin* 5:116, 1911.

¹⁰ Arnald was a great traveler and sometimes used forced leisure for the composition of some treatise. Thus between 1309 and 1311 he wrote his treatise *De Vinis* when a north wind had driven his ship to North Africa, where he was stranded for some time.

authority on medicine. Galen concludes the century. He is an eclectic, anxiously avoiding any affiliation with a definite school. But there is one master he serves—Hippocrates. He feels himself to be a Hippocratic physician, not a disciple but a worthy successor to Hippocrates. In a monograph of high scholarship, Temkin⁴¹ has pictured the very intricate history of Hippocratism from the time of Galen through the school of Alexandria down to the time of the Arabian conquest. Hippocrates and Galen are intimately connected in this development. The Hippocratism that finds itself established in the fourth century, in Alexandria, due largely to the work of Oribasius, is determined by Galen. This Hippocratism is medical as well as philosophical. The Alexandrian scholars are *iatrosophistae*. A final chapter studies the canonization of the works of Galen and Hippocrates and throws new light on endless detailed problems. Working on that period is like breaking the soil in a virgin forest.

§

Only a few Hippocratic treatises were translated into Latin in the early Middle Ages until the wave of translations from the Arabic brought new texts. In the later Middle Ages, some Hippocratic treatises, notably the *Aphorisms*, were much discussed and commented upon, but Galen and Avicenna were the dominating authorities. The Renaissance witnessed a revival of Hippocrates, and from then on the more the fame of Hippocrates increased, so did the star of Galen decline. He appeared as the ideal doctor. To be called the Hippocrates of one's country was the highest title of honor that could be bestowed upon a physician. Each period looked at him differently and attributed to him all the qualities it was missing in its own physicians.

Endless papers are being written in our day on Hippocrates and Hippocratic medicine by medical men. They can be divided into three groups.

The first and by far the largest group consists of papers written without any knowledge of the sources, without any critical sense, mere compilations from current textbooks perpetuating errors from generation to generation. We need not mention them here. The sooner they are forgotten, the better.

Then there is a second group of studies in which medical men examine the medical content of the *Corpus Hippocraticum*. It need not be emphasized that such studies are extraordinarily important. The philologist

⁴¹ Owsei Temkin, "Geschichte des Hippokratismus im ausgehenden Altertum," *Kyklos, Jahrbuch für Geschichte und Philosophie der Medizin* (Leipzig) 4:1-80, 1932.

Part I is the one that has shocked physicians most. Was this Arnald's work? It is not impossible, although I cannot give any definite answer to the question at the moment. The *Opera* include a number of other short—and very interesting—treatises that have shocked tender souls, although they must have delighted medieval readers. Such were *De Decoratione* and *De Ornatu Mulierum*, two revealing treatises on cosmetics, or *De Maleficiis* that teaches how to restore the virility of a man who has been bewitched. All these treatises must be examined together some day, and their views and style must be compared with those of the undoubtedly genuine works.

There is another point which in such cases must always be kept in mind. When a scholar dies—and this applies to the Middle Ages as well as to our own days—the students who examine the papers of his desk will find a lot of notes, abstracts, drafts, raw materials that were never intended or were not ready for publication. It is quite conceivable that Arnald planned a treatise *De Cautelis Medicorum*, that he copied passages on the subject from earlier manuscripts, added perhaps a few notes of his own, and that this unfinished product was later circulated under his name.

Whoever the author or authors may have been, there is no doubt that the treatise is medieval and that it is interesting in that it gives us a picture of what the behavior and bedside manners of certain doctors were at that time. Since it went under the great name of Arnald, it must have exerted a certain influence.

The Latin original is readily accessible as it is included in all editions of Arnald's *Opera* from 1504 on. In the following I have attempted to give an English translation that was not always easy because the text is written in a rather vulgar Latin and is corrupt in several places.

ON THE PRECAUTIONS THAT PHYSICIANS MUST OBSERVE

I

We must consider the precautions with regard to urines, by which we can protect ourselves against people who wish to deceive us. The very first shall consist in finding out whether the urine be of man or of another animal or another fluid; and if it is human urine it is diagnosed in four ways.

The second precaution is with regard to the individual who brings the urine. You must look at him sharply and keep your eyes straight on him or on his face; and if he wishes to deceive you he will start laughing or the color of his face will change, and then you must curse him forever and in all eternity.

ments described in the Hippocratic writings.⁴⁵ His new book traces the development from the early beginnings among the sixth century philosophers down to Hellenistic times, stressing Theophrastus' contributions and giving full attention to the physicians.

The third group of medical papers on Hippocrates finally includes studies on Hippocratic medicine as a whole, discussing the general principles—the "spirit" of Hippocratic medicine—which are written from a purely medical point of view. Medicine today has become very efficient, but at the same time highly technical and mechanized. It was not so in the time of Hippocrates. Many physicians, dissatisfied with present day conditions, feel themselves compelled to "go back to Hippocrates." They interpret the Hippocratic writings in their own way, valuing not the technical knowledge but the general attitude of the Hippocratic physician towards nature and disease. They write on Hippocrates in order to influence modern medicine.

Typical of this special line is the work of the great Berlin surgeon August Bier. He wrote a long series of articles on Hippocratism,⁴⁶ giving a summary of his studies in a shorter paper,⁴⁷ the beginning of which characterizes the whole attitude splendidly: "The essence of Hippocratism to which we have to revert under any circumstances, is the concept of physis with the subordinate concepts of constitution, right and wrong mixture of the body, attraction and reversion."

The same attitude is shown in a book of the bacteriologist Hans Much, which appeared under the title, *Hippocrates the Great*.⁴⁸ The book has nothing whatever to do with Hippocrates. The name is merely a symbol, a flag under which Dr. Much expressed his general ideas on medicine.

A similar study was written in Italy by Liborio Giuffrè,⁴⁹ and Arturo Castiglioni gave a good analysis of the whole trend.⁵⁰

⁴⁵ G. Senn, "Ueber Herkunft und Stil der Beschreibungen von Experimenten im Corpus Hippocraticum," *Archiv für Geschichte der Medizin*, 22:217-289, 1929; "Nochmals die Experimente im Corpus Hippocraticum," *Verhandlungen der Naturforschenden Gesellschaft* (Basel) 41:109-128, 1931. See also O. Regenbogen, "Eine Forschungsmethode antiker Naturwissenschaft," *Quellen und Studien zur Geschichte der Mathematik* (Abt. B. Studien) 1:131-182, Berlin, 1930.

⁴⁶ August Bier, "Hippokratismus," *Münchener Medizinische Wochenschrift* 77:2193, 1930; 78:113, 154, 355, 408, 483, 540, 919, 961, 1931.

⁴⁷ August Bier, "Hippokratische Studien," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, (Berlin) 3(2):1-28, 1932.

⁴⁸ Hans Much, *Hippokrates der Grosse*, Stuttgart, Berlin, 1926.

⁴⁹ Liborio Giuffrè, *La Dottrina d'Hippocrate*, Palermo, 1933-XI.

⁵⁰ Arturo Castiglioni, *L'Orientamento Neoippocratico del Pensiero Medico Contemporaneo*, Torino, 1933-XI.

concerns me," then you shall know the sex. If she says, no, ask as has been explained under the fourth precaution.

The eleventh precaution is taken with regard to white or yellow wine. If you have any doubts in this respect, be cautious and put the lid of the urinal down and pour out a little of the content in such a way that the wine in being poured out touches your finger. Then you must give her the urinal and act as if you were going to blow your nose whereby you put the finger that has been dipped in, on or next to your nose; then you will smell the odor of wine, whereupon you must take the urinal again and say to her: "Get away and be ashamed of yourself!"

The twelfth precaution is taken with respect to fluid made from figs and also nettles. Although you could recognize this under the first precaution, yet you will clearly see that the residue extends in the form of a circle touching the urinal and does not make a rotundity or pine cone like a true sediment.

The thirteenth precaution: whenever the old woman asks what disease the patient has, you must say: "You would not understand me if I told you, and it would be better for you to ask what he should do." And then she will see that you have judgment in the matter and will keep quiet. But perhaps she will say: "Sir, he is very hot; therefore he seems to have a fever."—"Thus it seems to you and other lay people who do not know how to distinguish between fever and other diseases."

The fourteenth precaution: When you have been called to a patient, feel the pulse before you examine the urine and make them talk so that the condition of the animal virtue becomes apparent to you. After having recognized these factors you will be able to evaluate the urine better and with more certainty and you may proceed thus.

The fifteenth precaution is: should the patient be in a bad condition so that you think that he may die the following day, do not go to him but send your servant to bring you the urine, or tell them to bring it to-morrow in the early morning because you wish that they prepare for the meal and that after you have seen the urine you will tell what they shall administer. And so from the report of the person who brings the urine you will be able to form an opinion about the patient, whether he is in good or bad condition.

The sixteenth precaution is that when you come to a patient you should always do something new lest they say that you cannot do anything without the books.

The seventeenth precaution is that if by hard luck you come to the home of the patient and find him dead and somebody perhaps says: "Sir, what have you come for?" You shall say that you have not come for that, and say that you well knew that he was going to die that night but that you wanted to know at what hour he had died.

The eighteenth precaution is that if you have a competitor whom you believe to be a shameless crook, be careful when you go to the house of the patient; perhaps he will stir up the urine for you and you will not be able to form a certain judgment from it.

The nineteenth precaution is the following: if two urines of the same patient are presented to you and you wish to know which was the first, ask at what time of the night he got up, for if he did at dawn or after digestion had taken place that urine which is more digested and red will be the first, if it has sediment. If, however, he

Is this medical humanism? Probably not. But the journal is well done, original in purpose, and it certainly fulfills a not unimportant function.

§

It is a great thing that the medical profession has in Hippocrates a living ideal, a hero that it can worship and follow. However, this should not prevent the historian from seeking the truth. Investigating the sources critically, he will have to destroy illusions occasionally. The ideal will remain untouched.

The purpose of this very fragmentary review was to give a brief picture of the various activities in the field of Hippocratic research. Important work is being done, work that should be taken into careful consideration by all medical men who talk and write on Hippocrates.

stretch the fingers or make a fist. While you apply the fingers of your right hand you shall support with the left the patient's arm, because from greater sensibility you will distinguish the different and various motions more easily, and also because the patient's arm being so to say weak requires your support. If the arm is very full and fleshy you must press your fingers hard so as to get into the depth; if it is weak and lean you can feel the pulse sufficiently on the surface. You must examine the pulse to a hundred beats at the very least, so that you may form an opinion on the various kinds of pulses, and the patient's people should receive your words as the result of a long examination of the heart beat.

Finally you request to have the urine brought, and if the change in pulse indicates that the individual is sick, the kind of disease is still better indicated by the urine, but they will believe you to indicate and diagnose the disease not only from the urine but also from the pulse. While you look at the urine for a long time you pay attention to its color, substance, and quantity, and to its contents from the diversity of which you will diagnose the different kinds of diseases, as is taught in the *Treatise on Urines*, whereupon you promise health to the patient who is hanging on your lips. When you have left him say a few words to the members of the household, say that he is very sick, for if he recovers you will be praised more for your art; should he die his friends will testify that you had given him up.

Let me give you one more warning: do not look at a maid or a daughter or a wife with an improper or covetous eye and do not let yourself be entangled in woman affairs—for there are medical operations that excite the helper's mind; otherwise your judgment is affected, you become harmful to the patient, and people will expect less from you. And so, be pleasant in your speech, diligent and careful in your medical dealings, eager to help. And adhere to this without fallacy.

When you have been invited for dinner you should not throw yourself upon the party and at the table should not occupy the place of honor although it is customary to assign the place of honor to the priest and the physician. Then you should not disdain certain drinks, nor find fault with certain dishes, nor be disgusted perhaps because you are hardly accustomed to appease your hunger with millet bread in peasant fashion. If you act thus your mind will feel at ease. And while the attention is concentrated on the variety of dishes, inquire explicitly from some of the attendants about the patient or about his condition. If you do this the sick will have great confidence in you, because he sees that you cannot forget him in the midst of delicacies. When you leave the table and come to the sick, you must tell him that you have been served well, at which the patient greatly rejoices because he was very anxious to have you well served.

If it is the time and place to feed the sick you will feed him. It is necessary, however, that you set the time for the patient's meals, namely in intermittent fevers when the sick have a real remission; in continuous fevers when there happens to be a quiet moment because a decline of their fever does not occur before the crisis. In intermittent fevers they must be fed before the attack and so early that when the attack comes the entire food be digested, because otherwise nature will have to fight a war on two fronts and it will not be strong enough to digest what has been offered at the wrong moment nor will it be able to defeat the enemy disease. When the attack of fever has begun, wait until it has ceased and then wait for two

§

We must remember that medieval medicine had two centers of development, the Muslim empire in the East and the Christian world in the West.¹

In the seventh century A.D., Arab tribes, driven from their homeland by the aridity of the soil, united and disciplined by a new creed, moved north seeking more fertile lands. They conquered Syria, turned west, conquered Egypt, the whole coast of North Africa, went over to Spain, crossed the Pyrenees, until they were stopped in France. In less than a century they had founded an empire that reached from the Pyrenees to the Indus River. They were tolerant. No one was forced to embrace the new religion, but the infidel was a subject heavily taxed. It was highly profitable to become a Mohammedan. The convert acquired Arabic citizenship and became a member of the ruling class. Millions adopted a religion which, after all, was not so different from Christianity. The new empire was united by a common faith, disciplined by religious rites, and, since the Koran was not to be translated, it had a common language.

The Arabic conquerors were a rough crowd, horsemen, warriors, poets at times, but little experienced in the arts and crafts. They soon found that the people they had subjugated had better architects, painters, engineers, and physicians. They hired them and soon began learning from them. Alexandria, although the famous library had been destroyed before the conquest, was still a center of learning. It was obscured by mystic currents but was backed by a great tradition; Paulus of Aegina, the last great Greek medical compiler, lived there in the first half of the seventh century.

More important because it was infinitely more dynamic was another intellectual center, Gondeshapur, in Persia. A foundation of Sassanian kings, it had become an asylum for refugee scholars. Greek philosophers driven from Athens by Justinian, Christian heretics, Nestorians driven from Nisibis convened in Gondeshapur where they came in touch with Persian and Indian thought. Of all the sciences medicine was probably the most flourishing, centered around a hospital and an academy. Syriac had become the language of learning in Western Asia, and many classics of Greek philosophy, science, and medicine were translated into Syriac.

And so the Arabs found in the territory of their conquest not only

¹ If I speak of East and West, I do it for the sake of brevity. I am well aware that throughout the Middle Ages there were Mohammedans in Spain and Christians in Syria.

she wishes to reduce the forces of the disease by changing the condition and quality of the matter and by dispersing it among the organs so that the parts be separated from each other and she may reach her end and more easily than expected with complete results in one weak expulsion. In the same way, the physician in order to drive out the matter that must be driven out, must be prepared to treat the digested matters, according to the aphorism in the first book of Hippocrates. Consideration of the cause of the disease determines the choice of remedies that digest the humors; for if the patient suffers from cholera you will give vinegar syrup; if he suffers from a cold humor you will give oxymel, and everything else as I have said in another chapter. Oh physician, thanks be given to God.

was different. The Goths were converted to Christianity, which was the official religion of the Roman Empire. Its language was Latin, and Latin became for centuries the literary language of all nations that recognized the authority of the Church of Rome.

For over 1000 years medical books had been written in Greek throughout the Graeco-Roman world, and very few Latin medical books were available. But Latin was becoming an increasingly important language. It was the language of the court, the administration, and the church. It was the vernacular language of Italy, Gaul, and Spain, and was the literary language not only in Germany but in North Africa and Britain. There was a strong demand for medical books written in Latin. Translations were made in the West as in the East, and from the fourth century on a new medical literature developed which was written directly in Latin. It was not original in character but consisted of compilations, its value depending on the sources used. The West had intellectual centers also. One such center was North Africa, in the fourth and fifth centuries, where Saint Augustine lived and where one of his friends, the physician Vindician, and his pupil Theodorus Priscianus compiled some important books. An African, Caelius Aurelianus, translated Soranus and thus preserved the experience of the Methodist school, the doctrine of which was very influential in the early Middle Ages.

Another such center was Bordeaux, famous for its school of rhetoric. But there were physicians there too, such as Marcellus Burdigalensis, who compiled a very popular collection of prescriptions. Ravenna, the residence of Theodoric, had in the sixth century a medical school the outlines of which we just begin to perceive. It had *iatrosophistae*, professors of medicine, who interpreted the Galenic canon in Latin in the same way as was done in Alexandria in Greek. Oribasius was translated twice in Ravenna, and there can be no doubt as to the importance of this school. Roman institutions did not perish in the early Middle Ages. Many schools flourished in Italy in the Lombard period and became starting points of universities, as was the case in Bologna.

At the time when Harun al-Rashid attracted scholars and artists to his court, Charlemagne did the same in the West and laid the foundation for schools that were to become famous in Tours, Chartres, Rheims. At the same time, Benedictine abbeys, like Monte Cassino, Bobbio, St. Gall, copied, and passed on from generation to generation.

Fulda, were centers of learning where ancient literature was studied. There can be no doubt, however, that the Muslim world was far ahead

In Italy it happened not infrequently that surgeons entered medical schools to be trained as physicians, or that physicians acquired practical surgical knowledge. These surgeon-physicians are responsible for some of the most famous textbooks of surgery written in the Middle Ages. Finally, there was another category of individuals who performed surgical operations—the numerous quacks who wandered all over Europe as tooth pullers, bonesetters, and eye specialists. They had no legal status and were prosecuted quite often, but still could be found in every market place.

A great deal is known about medieval surgery. It is known that in the thirteenth century the ideal wound healing was considered the healing *per primam intentionem*. Cleanliness was recommended to the surgeon so as to avoid all irritations, the dressings were often impregnated with old wine, and somniferous sponges were used before the operation; the general impression of the period is that surgery had reached a high level to which it was to return only much later.

However, very little would be known about the daily life of the medieval surgeons and their behavior at the sickbed of the patient, if vivid descriptions that are to be found in Henri de Mondeville's treatise of surgery were not available. They give delightful sidelights on the practice of medieval surgeons. Henri de Mondeville was born about 1260. He studied medicine, in all probability, in Montpellier and in Paris. Interested in surgery, he went to Italy and became the student of the great surgeon, Theodoric. A document dated 1301 states that Mondeville at this time was surgeon to the king of France, traveling with him and following the armies. It seems that he gave lectures on surgery and anatomy in Montpellier and later in Paris. In 1306 he began to compose his book, on which he worked for many years. He died in 1320 after a protracted illness that seems to have been tuberculosis.

His treatise on surgery is preserved in quite a few manuscripts, and was first edited in the Latin original by J. L. Pagel.¹ An excellent French translation was made by Édouard Nicaise in 1893.²

Mondeville had a critical mind. He was not afraid to attack even the

¹ *Die Chirurgie des Heinrich von Mondeville*, zum ersten Male herausgegeben von Hr. J. L. Pagel, nebst einer Abhandlung über Synonyma und einem Glossar von M. Steinschneider, Berlin, 1892, A. Hirschwald, In-8, 663 pp.

² *Chirurgie de Maître Henri de Mondeville, Chirurgien de Philippe le Bel, Roi de France*, composée de 1306 à 1320, traduction française . . . par Édouard Nicaise, Paris, Félix Alcan, 1893, 903 pp. (The pages indicated in the text of this paper refer to this French translation.)

twelfth century Gerard of Cremona and his students translated a large number of Greek and Arabic medical, scientific, and philosophic writers from Arabic into Latin. In the early thirteenth century the western world possessed the Greek medical tradition as the Arabs had done three hundred years before, and possessed in addition the experience of many Arabic scholars.

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The Greek medicine that was transmitted to the Middle Ages, in the East and in the West, was the result of a development of over 1000 years. All schools of thought from the early pre-Socratic philosophers to Plato, Aristotle, the Stoics, Epicureans, and Skeptics, to the vagaries of Neo-Platonists and Neo-Pythagoreans, were reflected in some way or other in the physicians' theories. This enormous mass of literature was transmitted in a relatively short period of time, in a haphazard way without any order. A book was translated when good manuscripts were available. This determined the choice first of all. Hunayn ibn Ishaq translated one day the Hippocratic *Aphorisms*, a book written around 400 B.C., and some other day he made a version of a Galenic treatise written almost 600 years later. Gerard of Cremona within a few years rendered such disparate books in Latin as the *Techne iatrike* of Galen and the *Liber Almansorius* of Rhazes. This new literature was taken over not as a collection of historical documents but as a living whole. It was studied not by medical historians but by physicians desirous of learning from it how to treat their patients and how to comprehend the phenomena of health and disease. Viewed from such an angle, the Greek medical tradition was extremely bewildering. It was full of contradictions. Many descriptions of diseases and many prescriptions were unintelligible. A theory that a Greek physician familiar with the philosophy of Pythagoras found easy to understand seemed strange and foreign to an Arab or Christian cleric of the early days. A great deal of interpretation was required before this new learning could be assimilated.

Dictionaries were written for the elucidation of difficult terms or concepts, commentaries to explain authoritative texts, concordances in which similar opinions were brought together, conciliators to reconcile divergent views. Such books were written in the East and in the West.

The Greek tradition, however, carried to the Middle Ages not only doctrines but basic observations and methods. It taught that disease is a

too much. Therefore I advise you, in your interest, and out of sheer love, not to call for a surgeon and, although not a surgeon myself, I will endeavor to help you without them." If the sick man accepts, and everything goes well, all the better. If it goes wrong, the physician will say to the sick man, "Sir, I told you from the beginning that I was not a surgeon myself. However, for the reasons mentioned, and because I felt sorry for you, I did what I have done, and did it well and, according to the art and to reason, better than any surgeon. God knows it. Now I am extremely busy and cannot give you as much assistance as before, and I advise you to call for a surgeon, although this will not cure you more rapidly." Then the physician goes on, saying, "I advise you to call such and such a surgeon. He is very able, not arrogant, and an honest man. He knows his art very well, perhaps better than more famous surgeons." Then he brings in a miserable surgeon, without education, a ruffian, completely ignorant, and he does so for four reasons: (1) so that the surgeon cannot check the errors of the physician; (2) that he may continue his surgical treatment and have authority over the uneducated surgeon; (3) so that, if necessary, he can make the surgeon responsible for his own faults, past and future; (4) in order to get the honor and profit for himself, but to leave the mistakes and shame to the surgeon, as the case may be.

The surgeons, on the other hand, did not behave much better (p. 100):

If it is a surgeon who is called first, for a purely medical treatment, never will a physician be called on his advice. On the contrary, the surgeon will do whatever he can to keep off the physician, and this for several reasons: 1. The physicians know nothing and do nothing to the patients except talk to them, and all of them without any difference; whether the case requires it or not, they purge the patients. 2. The surgeons and nature cure such maladies every day without the help of physicians. 3. If you call a physician, he will immediately purge the patient, whether it be necessary or not.

The different behavior of honest and dishonest surgeons is illustrated by the following case (p. 100):

A rich man has a beginning inflammation. He calls a conscientious surgeon who says, "Sir, so far, this is not yet a surgical case, because nature does not require any remedy. Should the inflammation increase, call for me." It then happens that the patient calls for a dishonest physician or surgeon. If it is a surgeon, he will say immediately, "Sir, you have a very large abscess. I feel it inside. If I do not operate on you immediately, you are undoubtedly lost." Then the surgeon, with attractive remedies, will cause an abscess, and will obtain reward, gratefulness, fame and honor, because he saw a nonexistent abscess that the first surgeon had not seen. And this surgeon, for having said the truth, will incur infamy, shame and harm.

The question of the fee plays a very important part in Mondeville's discussions (p. 112):

The surgeon who wants to treat his patients properly must settle the matter of the fee first of all. If he is not assured of his fee, he cannot concentrate on the case. . . .

medicine. An Egyptian Jew, Isaac, wrote important monographs on fever, urine, diets, and drugs. One of his students, Ibn al-Jazzar, became well known for a little book in which he gave dietetic advice to travelers. It was translated not only into Latin but also into Greek and Hebrew. The greatest surgeon of the period, Abu'l Kasim, was born in Spain in El-Zahra near Cordova. He was influenced by Greek writers, notably Paulus of Aegina, but was an experienced surgeon himself. *Materia medica* was greatly enriched by Arabic writers. An empire that covered such a vast territory yielded drugs from all climates. A mere list of Muslim physicians who contributed to the subject would fill many pages and include names from all provinces.

The Greek tradition was assimilated in the West also, but later than in the East and in a somewhat different way. As we mentioned before, it was transmitted not in its pure form but after having gone through the Arabic channel. The experience of the Greeks was made available to the western Middle Ages together with that of the Arabs. Constantinus Africanus in the eleventh century translated not only works of Hippocrates and Galen but also those of Rhazes, Isaac Judaeus, Ibn al-Jazzar, and other Arabic writers.

Constantinus' work marks a turning point in western medieval medicine. It became known in southern Italy just at the time when the school of Salerno was developing vigorously. Salerno was a trading town where Greek was heard in the streets and where western and eastern influences converged. A group of physicians, laymen and clerics, were practicing in the town, sought by patients and by students from all over Europe. In response to a strong demand for a richer medical literature they compiled books such as the *Passionarius Galeni* which, however, still had all the characteristics of the early medieval literature. The translations of Constantine acted as a strong stimulus. They found in Salerno a group of physicians that was ready to absorb and assimilate them. The literature that Salerno produced in the twelfth century started a new movement in western medicine. The many books they wrote on all subjects of practical and theoretical medicine reveal that the Salernitan masters had not only assimilated the Graeco-Arabic tradition but had already been able to add observations of their own. It is highly significant that they were fully aware of the importance of anatomical studies. Human bodies were not yet dissected, but those of animals were.

Another important contribution to medicine, though of a different order, came from southern Italy. Frederick II in his *Constitutiones* of

IMPOTENCE AS A RESULT OF WITCHCRAFT

IN the majority of all cases impotence is due to nervous causes. It is a phobia. The fear of being impotent prevents individuals from having normal erections.¹ It is not astonishing that in the Middle Ages such a condition was frequently attributed to witchcraft. The question was important because it had legal consequences. Inability to consummate marriage was a reason for declaring it null and void *ab initio*.

The first who brought up the question of witchcraft in this connection was Hincmar, Archbishop of Rheims, who lived in the ninth century. In discussing a definite case he came to the following conclusion:² if a marriage has been annulled on account of the impotence of the husband, he cannot marry again if his impotence was due to natural (physical) causes. If his condition, however, was the result of witchcraft and the marriage had been declared void after the customary treatments had failed, he was permitted to marry again.

Gratian, who in the twelfth century codified canon law, accepted Hincmar's view, and so did Peter the Lombard in the same century in his *Liber Sententiarum*, where he has a special chapter: "De His Qui Maleficiis Impediti Coire Non Possunt."³ Peter's book was commented upon by the leading scholastic theologians.⁴

Since impotence resulting from witchcraft was to be treated, not only was the Church interested in the question but the physicians also. In the

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¹ See Max Marcuse in *Handwörterbuch der Medizinischen Psychologie*, Leipzig, 1930.

² Jacques Paul Migne, *Patrologia Latina*, vol. 126, p. 150.

³ Lib. IV, dist. 34, *ibid.*, vol. 192, p. 927.

⁴ See Joseph Hansen *Zauberwahn, Inquisition und Hexenprozess im Mittelalter*, München und Leipzig, Historische Bibliothek XII, 1900, p. 152.

antiquity. Avicenna, one of the greatest physicians and philosophers of Islam, attempted to build a complete, logical, and well-rounded system of medicine. Its elements are to a large extent Greek—Greek medical experience and thought, Aristotelian philosophy, with a tinge of Neo-Platonism. To this was added the experience of several centuries of Arabic medicine and a great deal of personal experience. With these elements in hand, Avicenna created a system that was no longer Greek but was an expression of Muslim philosophy. It was so forceful and persuasive that it dominated medicine in the East and the West for 600 years.

In another sphere of medieval culture we find a physician-philosopher, Maimonides, who wrote *Aphorisms According to Galen*. The book is by no means a mere repetition of Galenic doctrines. Maimonides selected passages from Galen. He selected what appealed to him particularly, and the choice he made already reflected his personality. He took a statement from Galen as motif and developed it in his own way, thus creating a synthesis of Greek, Arabic, and Jewish thought.

The same synthetic process can be traced in the works of the western scholastic physicians of the thirteenth and fourteenth centuries, Albertus Magnus, Roger Bacon, Arnald of Villanova, Pietro d'Abano, to mention only a few. Aristotle, Galen, and Avicenna were their masters. They quote them constantly and follow their methods. But they did more. They were Christian scholars. Theology was the mother of science and learning, and they succeeded in creating systems in which the experience of medicine became part of the Catholic concept of the world. Their works are essentially medieval.

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The parallelism in the development of medicine in the East and in the West is striking but is easily explained by the common heritage and by the whole situation in which both groups of people found themselves in the early Middle Ages. It is much more difficult to explain why this parallelism came to an end.

The golden age of Arabic medicine was short. After 1100 there was a steady decline. Factual contributions to medicine were still made and many books were written, but there was hardly any development. People looked backward and not into the future, commented upon their classics and followed traditional patterns of thought. The Islamic world re-

Si enim maleficium recte extirpare volumus, videndum est, si supradictum maleficium subsit lecto, auferatur. Sed si actor istius maleficii in die auferat et in nocte ponat vel converso, aliam domum acquirant sponsus et sponsa ibique iaceant.

Si karacteribus hoc maleficium fiat, quod cognoscitur quia sponsus et sponsa, non diligant se adinvicem, queratur supra limen hostii vel infra, et si quid inveniat, deferatur ad episcopum vel ad sacerdotem, sed si non, fiant ea que inferius ponuntur.

Si nux vel glans sint causa huius maleficii, accipiat mulier quandam nucem vel glandem separetque eam, et cum una medietate pergat vir ex una parte alicuius vie et ibi ponat, mulier vero ex altera parte vie ponat alteram partem mucis, deinde sponsus et sponsa accipiant ambas partes nucis testa non extracta et postea sic tota nux reintegretur et servetur per vii dies, hoc facto coheant.

Si autem sit propter fabas, magis divinis quam humanis curari potest. Si sit propter acus mortuorum, querantur maleficia vel in fulon⁹ vel in pulvinari. Si non inveniantur, in altera domo concumbant.

Canis fel masculi domum purgat et efficit ut nullum malum medicamentum domui inferatur.

Canino sanguine domus parietes asperge et ab omni maleficio liberabitur.

Fel alicuius pissis et maxime zangarini [id est lucii] si sponsus et sponsa secum habeant in pisside iuniperi et cum eunt dormitum ponatur super carbones vivos et inde fumigentur, omnia supradicta maleficia evanescent.

Similiter si argentum vivum accipiat et in calamo canne mittatur, calamo cum cera et plumbo cohopto, nescientibus sponso et sponsa, in loco nullum maleficium eis nocebit.

Sed si peccatis imminetibus supradicta minime profuerunt, accedant ad sacerdotem vel episcopum, et si episcopus hoc concesserit et nullum remedium invenitur, facta confessione ab episcopo vel a religioso sacerdote, in die sancte resurrectionis seu ascensionis vel pentecostem communicentur. Corpore et sanguine domini accipio, sponsus et sponsa dent inter se osculum pacis et accepta benedictione ab episcopo vel a sacerdote, det sibi episcopus vel sacerdos hunc versum profeticum scriptum in carta: Vox domini super aquas, dominus magnus super aquas multas.¹⁰ Deinde veniant domum et a copulatione per tres dies et noctes se custodiant, postea rem agant et sic omnis diabolica virtus destruitur.

Expletus est libellus de maleficiis. Deo gracias amen.

TRANSLATION

A short treatise about the people who, impeded by spells, are unable to have intercourse with their wives.

There are people who, impeded by diabolical spells, are unable to have intercourse with their wives. We do not want to deprive our book of their applause, for the remedy, if I am not wrong, is most sacred.

Now, if this should happen to somebody, he must set his hope in the Lord and

⁹ Other MSS have "culcitra."

¹⁰ Psalm 28.3 in the Vulgate; 29.3 in the King James version.

BEDSIDE MANNERS IN THE MIDDLE AGES: THE TREATISE *DE CAUTELIS MEDICORUM* ATTRIBUTED TO ARNALD OF VILLANOVA



SINCE I published a study on the book *De Vinis*¹ of the great scholastic Spanish physician Arnald of Villanova (1235?-1311),² I have been examining some of his other treatises, among which is one of a few pages only, entitled *Arnaldi de Villa Nova de Cautelis Medicorum*,³ which for a long time has been the subject of controversies. The treatise, similar in title and intention to that of the fourteenth century Bolognese physician Albertus de Zancariis,⁴ discusses the physician's conduct in the course of his practice and advises him to take certain precautions in dealing with patients of various classes and their relatives, and particularly also in the practice of uroscopy.

We learn that patients sometimes deceived their doctors when they sent them their urine for examination, probably in order to test their knowledge and skill. It is only fair that doctors should have been warned

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¹ *The Earliest Printed Book on Wine*, by Arnald Villanova . . . , New York, Henry Schuman, 1943.

² For the biography see Menéndez Pelayo, *Historia de los Heterodoxos Españoles*, Madrid, 1880; Barthélemy Hauréau, "Arnald de Villeneuve," in *Histoire Littéraire de la France*, vol. 28, Paris, 1881, pp. 26-126; Paul Diepgen, *Arnald von Villanova als Politiker und Laientheologe*, Berlin-Leipzig, 1909; Paul Niepgen, "Studien zu Arnald von Villanova," *Archiv für Geschichte der Medizin* 3:115-130, 188-193, 369-396, 1910; 5:88-120, 1912; 6:320-400, 1913; Paul Diepgen, "Die Weltanschauung Arnalds von Villanova und seine Medizin," *Scientia* 61:38-47, 1937. The thesis of E. Lalande, *Arnald de Villeneuve, sa vie et ses Oeuvres*, Paris, 1896, is quite uncritical and full of errors.

³ In the edition Basileae 1585, which I am using, the text is found on col. 1453-1454.

⁴ Manuel Morris, *Die Schrift des Albertus de Zancariis aus Bologna, De Cautelis Medicorum habendis*, Dissertation, Leipzig, 1914.

Similarly, if quicksilver is taken and put into a reed pen and the pen is sealed with wax and lead while the bridegroom and bride know nothing about it, no spell will harm them at the place.

If, however, on account of impending sins, the above-mentioned measures did not help at all, they shall go to a priest or the bishop. And if the bishop has permitted it and no remedy is found, after having confessed to the bishop or an ordained priest they shall take Holy Communion on the day of the Holy Resurrection or Ascension in Whitsuntide. Having received the Body and Blood of the Lord, bridegroom and bride shall give each other the kiss of peace.

And after they have received the benediction of the bishop or priest, the bishop or priest shall give this verse of the prophet written on paper: The voice of the Lord is upon the waters; the great Lord is upon many waters. Thereafter they shall go home and shall abstain from intercourse for three days and three nights. Then they shall perform it, and thus all diabolical power is destroyed.

The little treatise on spells has come to an end. Thanks be to God. Amen.

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Impotence as a result of witchcraft was discussed by many scholastic physicians whose writings have been reviewed very carefully by Gerda Hoffmann.

Since witches were considered the chief authors of such evil spells, the *Witches' Hammer*, the *Malleus Maleficarum*, of 1489 devotes many passages to the question.¹¹ Following the Dominican scholar Peter of Palude who died in 1342, it distinguishes five methods by which the devil causes impotence;¹²

And as to this, Peter of Palude (III, 34) notes five methods. For he says that the devil, being a spirit, has power over a corporeal creature to cause or prevent a local motion. Therefore he can prevent bodies from approaching each other, either directly or indirectly, by interposing himself in some bodily shape. In this way it happened to the young man who was betrothed to an idol and nevertheless married a young maiden, and was consequently unable to copulate with her. Secondly, he can excite a man to that act, or freeze his desire for it, by the virtue of secret things of which he best knows the power. Thirdly, he can so disturb a man's perception and imagination as to make the woman appear loathsome to him: since he can, as has been said, influence the imagination. Fourthly, he can directly prevent the erection of that member which is adapted to fructification, just as he can prevent a local motion. Fifthly, he can prevent the flow of the vital essence to the members in which lies the motive powers; by closing as it were the seminary ducts, so that it does not descend to the generative channels, or falls back from them, or does not project from them, or in any of many ways fails in its function.

¹¹ *Malleus Maleficarum*, translated by the Rev. Montague Summers, London, 1928.

¹² Part I, question 8, p. 55.

several times, and there are open contradictions between beginning and end.¹¹ Henschel already recognized that the treatise consists of several different parts. He distinguished four:

I. The initial section on uroscopy beginning *Videndae sunt cautelae circa urinas* (col. 1453 in the edition of 1585) and ending *et caveas tibi quoniam magnus honor est Medico, si sciat sibi cavere, quia multoties interrogatur* (1455 B).

II. A short paragraph of 10 lines, *Nota quod medicus debet esse in cognoscendo studiosus . . . benevolus patienti debet esse* (1455 B-C).

III. The largest section, *Medicus cum ad aegrotum vocaberis* (1455 C) to *quia illa cogunt cibaria indigesta exire, vel digestionem retardant* (1458 B), which as Henschel correctly recognized is nothing else than the first third of a text that also occurs in the twelfth century *Codex Salernitanus* of Breslau¹² and that was published by de Renzi in his *Collectio Salernitana*.¹³ Henschel did not know at that time that his text is itself an abstract of a large treatise *De Instructione Medici* of the Salernitan physician Archimatheus.¹⁴

IV. A few terminal sentences, *Nota praeterea, quod medicum in principio morbi . . . sicut dixi in alio capitulo, qui incitabatur. O medice, Deo gratias.* (1458 C-D).

Thus we see that the bulk of the treatise (part III) was not written by Arnald but was known a century before his time. Can any other part be attributed to him? Henschel, endeavoring to glorify his hero, thought that only part II might be his work, which seems unlikely to me. Part II consists of only one paragraph which, although not identical, yet is very similar in character to the early medieval deontological texts published by Ernst Hirschfeld.¹⁵

Part IV is not an independent section but belongs to part III. It consists merely of a few sentences that belong to the same text as it might have occurred in another than the Breslau manuscript.

¹¹ Thus a passage in part II forbids the physician to promise the patient health, while another in part III says that it should be done.

¹² See Henschel, "Die Salernitanische Handschrift," *Janus* 1:307-309, 1846 Karl Sudhoff, "Die Salernitaner Handschrift in Breslau (Ein Corpus Medicinæ Salerni)," *Archiv für Geschichte der Medizin* 12:114, 1920.

¹³ Volume II, p. 72 ff., Naples, 1853.

¹⁴ It was published by de Renzi in vol. V, pp. 333-349, Naples, 1859. About the author, see Hans Erchenbrecher, *Der Salernitaner Arzt Archimatheus . . .*, Dissertation, Leipzig, 1919.

¹⁵ *Archiv für Geschichte der Medizin* 20:333-371, 1923.

was that erroneous beliefs can harm an individual but can also relieve him.

Impotence is no longer a mystery, and we can understand the condition without taking recourse to the devil. Impotence, however, like other nervous disorders and particularly sexual neuroses, is still a playground for superstitions and quackery.

The third precaution is also with regard to the individual who brings the urine, whether man or woman, for you must see whether he or she is pale, and after you have ascertained that this is the individual's urine, say to him: "Verily, this urine resembles you," and talk about the pallor, because immediately you will hear all about his illness. It commonly happens with poor people and those of moderate means that they go to the doctor when they are afflicted very seriously.

The fourth precaution is with regard to sex. An old woman wants to have your opinion. You inquire whose urine it is, and the old woman will say to you: "Don't you know it?" Then look at her in a certain way from the corner of your eye, and ask: "What relation is it of yours?" And if she is not too crooked, she will say that the patient is a male or female relation, or something from which you can distinguish the sex. Should she say: "We are not related," then ask what the patient used to do when he was in good health, and from the patient's doing you can recognize or deduce the sex.

The fifth precaution is that you must ask if the patient is old. If the messenger says yes, you must say that he greatly suffers from the stomach, and that he spits a lot, and in the morning more than at any other time, for old people have by nature a cold stomach.

The sixth precaution: whether this illness has lasted for a long time or not. If the messenger says that it has, you must say that the patient is altogether irritable and that one can help him, or some such talk. If he says no, you must say that the patient is altogether oppressed because in the beginnings of diseases there is much matter that oppresses the organ.

There is a seventh precaution, and it is a very general one; you may not find out anything about the case, then say that he has an obstruction in the liver. He may say: "No, sir, on the contrary he has pains in the head, or in the legs or in other organs." You must say that this comes from the liver or from the stomach; and particularly use the word, obstruction, because they do not understand what it means, and it helps greatly that a term is not understood by the people.

The eighth precaution is with regard to conception. An old woman consults you because the patient cannot become pregnant. Perhaps you do not know the cause but say that she cannot hold her husband's sperm which she could have done very well if she had been well disposed.

The ninth precaution is with regard to a woman, whether she is old or young; and this you shall find out from what is told you. Should she be very old, say that she has all the evils that old women have, and also that she has many superfluities in the womb. Should she, however, be young say that she suffers from the stomach, and whenever she has a pain further down, say that it comes from the womb or the kidneys; and whenever she has it in the anterior part of the head, then it comes from the stomach; and whenever on the left side, then it comes from the spleen; whenever to the right, then it comes from the liver; and when it is worse and almost impedes her eyesight, say that she has pains or feels a heaviness in the legs, particularly when she exerts herself.

The tenth precaution: you must keep yourself very busy spitting or blowing your nose and if the old woman pesters you with the urine say quite casually: "What concern is this of yours?" or "Why do you pester me so much?" If she says: "Yes, it

seemed to have some relation to the disease from which the patient had died.

Both Herophilus and Erasistratus founded schools which continued for many centuries, and it is chiefly due to them that Alexandria was the center of anatomical studies throughout antiquity. When, in the second century A.D., Galen wanted to study anatomy, he had to go to Alexandria. This was the only place, he tells us, where you could find a skeleton. Human dissections, however, were no longer practiced, and one had to rely upon what was found by dissecting monkeys, pigs, and other animals.

And so there was anatomy long before the Renaissance. But it existed before the Alexandrian school. We can trace the beginnings in Greece back to the sixth century B.C., to the schools of the first philosophers, all of whom were scientists as well as philosophers. They observed the phenomena of nature and endeavored to draw conclusions from what they saw, speculating about the primary cause of all things. It would have been surprising had they not extended their studies to the bodies of animals.

Yet we can go back still farther. There was always some kind of anatomical knowledge. As soon as man began talking in an articulate language, he invented names to designate the parts of the body, very much as a child does. Whenever an animal was slaughtered, be it for the kitchen or for the sacrificial altar, anatomical observations were bound to occur, and the first classification of organs was probably a distinction between edible and nonedible parts. Primitive man must even then have been impressed by certain anatomical peculiarities, as was the Paleolithic man, who, in a cave of Spain, drew the outline of an elephant and within the picture drew a heart. Remains of a cosmic mythical anatomy are still preserved in our language. We still call the first cervical vertebra Atlas, carrying the dome of heaven, the cranium; we still speak of the Adam's apple, the mount of Venus, the labyrinth.

Whenever surgical operations were performed, the surgeon must have had some kind of anatomical knowledge. The earliest surgical book preserved, the Edwin Smith Surgical Papyrus, which was originally written at the time of the Old Kingdom in Egypt, gives evidence of such anatomical knowledge. Anatomy, therefore, is a very old science, and yet ancient anatomy was of a quite different character from the anatomy that was found at the time of the Renaissance. The surgeons' knowledge, as far as it went, was topographical. It was limited to certain regions of the body. As long as surgery was restricted to a small number of operations—

The Renaissance marks the turning point in attitude of man towards anatomy and towards the human body in general. The word "Renaissance" is a technical term from the history of art. Used first by Vasari, it became generally accepted after the publication of Jakob Burckhardt's classic book *Die Kultur der Renaissance in Italien* (1860). What does the Renaissance mean to medicine? It certainly was not a revival of learning, for there was learning in the mediæval universities. Nor was it a revival of Greek medical literature, for this had been known through translations from the Arabic since the eleventh century. Far more was it a revival of the Greek spirit of research—a new attitude of man towards his fellow men and the world as a whole. Humanity became the ideal of the new society which grew up first in Italy—a humanity that meant the highest possible development of the personality. And whenever strong personalities come forward, the traditional authorities are in danger of being uprooted. One essential feature of the period of the Renaissance is the discovery of the world, the great world that was unknown to the Greeks: new continents, with new plants, new species of animals, new races of mankind. But also the small world, the natural surroundings of man, were rediscovered. One looked at nature with different eyes. New inventories of vegetables and animals were taken, and investigation of the human body was a part of the great adventure, the discovery of the world. Once more men became aware of the beauty of the human body, and they endeavored to represent it in all its natural glory. If the mediæval artists as a rule failed to represent the nude body with anatomical exactness, it was not because they had no chance to study it but because their attitude towards the human body was different. In the Renaissance, the artist began to study the body by examining the ancient statues that were being excavated in ever-increasing numbers and by observing nature. Botticelli's Venus was distinctly inspired by the Medician Venus that had been unearthed in his time. Some artists, however, were not satisfied with studies in plastic anatomy but wanted to know the structure of the body under the skin. The prince of such investigators was Leonardo da Vinci.

When in the eighties the anatomical and scientific drawings of Leonardo were made available to the public through the publication of Richter, a great enthusiasm for Leonardo arose. His work was approached emotionally and uncritically, and he was considered the first real scientist of the occidental world. Then followed the studies of Pierre Duhem on the physics of Leonardo, where for the first time his work was

more hours or for one at least, because the organs are exhausted from the preceding battle and the attack of the enemy and do not want that a burden be imposed on them in the form of food, but after having so to say triumphed over the enemy they wish to have a rest.

You shall feed the sick according to the season of the year and according to the change of seasons and of the disease; and quantity and quality of food must be varied according to the diseases, for you shall give the patient ampler food in intermittent than in continuous fever, and colder food in a continuous than in intermittent fever, more food in winter and spring, less in summer and autumn because they stand it very badly. The age must be considered, and you will restore children more often than youths, because their consumption is greater on account of the liquidity of the humors and because they must grow, for it is according to nature to restore where there is a daily loss. Old people you will restore with less food because they have little heat and vigor; and also according to what they are accustomed to eat, because if they are accustomed to use an ampler and coarser diet you will not give them the same kind of food but rather prescribe a liquid or moderate diet. You must fear constipation of the bowels or flux, and if there is flux you must start out with coarser food such as quinces, sorb-apples, and medlars because they constipate through their thickness. If, however, there is constipation you will start out with lighter liquid foods. Thus you will give prunes and the cooked juice of Damascene prunes because they quickly eject through their heaviness. If the condition of the bowels is between the two, you will begin with a lighter and more liquid diet because this is very useful to the sick and protects against greater harm. If the bowels have moved, give such a diet because it relieves the various organs. Thus you shall give first prunes cooked in water, or pomegranates or almond milk that you shall prepare in the following way: almonds removed from the shells shall be put in hot water, whereupon they shall be ground thoroughly and a little cold water shall be added; the whole shall be stirred, strained through a clear linen cloth and given to drink. If however a little bread, that is the soft part of it, is cooked in the pot the almond milk is better digested than if it is drunk pure. After it has been prepared, a small amount must be poured off, and then one must remove by blowing or with a feather the oily substance that is on the surface because it is a hot matter. After this has been done, give several times chicken broth to drink or water in which the soft part of bread has been dissolved.

You shall also give barley flour and make it in the following way: first wash the barley in cold water, pour it over a stone and rub it so that it loses the skins; whereupon it must be rubbed and ground in a mortar or ground between millstones; then have the finer parts very well cooked and toward the end of the cooking add a little almond milk and present it to the sick. If, however, you wish to have ptisane, cook the coarser parts of the barley in water and give him ptisane in a drink, or water in which bread has been soaked, cooked or not. And remember that while there is food in the stomach you shall not give diuretic water with syrup because such drinks force the food out of the stomach undigested or retard digestion. Remember, furthermore, that in the beginning of the disease the physician endeavors to oppose it with digestive remedies, for he is the helper of nature and must aid it. Nature namely proceeds to making the crisis, to the triumph over the disease;

category of his time. He was extremely interested in function, in dynamics, while sixteenth century science was essentially static, and it was only 100 years later that dynamics were attacked by the scientist.

The doctors, too, were not idle. They, too, found themselves drawn to the study of the human body. Cadavers were now somewhat easier to obtain, and as early as the beginning of the sixteenth century we find quite an important group of anatomists who, although still convinced of the superiority of the ancients, performed a great many dissections themselves and left good descriptions of certain organs, men like Alessandro Achillini in Bologna, who wrote *annotationes* to Mundinus, Gabriele Zerbi in Padua, Alessandro Benedetti, and most important of all, Berengario da Carpi, professor of surgery in Bologna, who also wrote a commentary to Mundinus which contained some quite valuable observations.

The true founder of modern human anatomy, however, was Andreas Vesalius, a man who from early childhood had felt himself drawn to these studies. At the age of twenty-three, he was appointed professor of surgery and anatomy in Padua. Four months after his appointment he produced his first anatomical atlas, six plates illustrating the skeleton and the arterial and venous systems. What made his way clear was the discovery that ancient anatomy was essentially animal anatomy. He understood that the structure of the human body had never before been described completely and systematically, that the work still had to be done. Vesalius was lucky in having a very fine artist to assist him. At the age of twenty-seven he had accomplished a task that in other people would have represented the work of a lifetime. In the year 1543 the seven books *De Corporis Humani Fabrica* were published in Basel, a great work and a beautiful book of 663 folio pages with more than 300 illustrations. An *Epitome* for teaching purposes appeared simultaneously, and this *Epitome* was translated into German as a textbook for surgeons by the rector of the University of Basel, Albanus Torinus.

Vesalius lived to the year 1564, but his work had been done long before that. He resigned from the University of Padua and lived at the imperial court as a body-physician to the Emperor. The inspiration he had given was strong enough to spread enthusiasm for anatomical studies throughout the century. His chair in Padua was for a long time filled by people who continued to be the leaders in anatomical study; Realdo Colombo, well known for his description of the pulmonary circulation; Gabriele Fallopio, whose *Observationes Anatomicæ* are noteworthy for their accuracy; Fabricius of Acquapendente, whose anatomical theater

SIDELIGHTS ON THE PRACTICE OF MEDIEVAL SURGEONS

THERE were different types of surgeons during the latter part of the Middle Ages. The physicians who were trained in the universities had surgical knowledge, but it was merely theoretical. The physician as a rule did not perform any manual labor. His task was to examine a patient and to indicate the appropriate therapy, which was applied by the physician's helpers, the surgeon or the apothecary.

The medieval surgeons were educated as craftsmen and were organized in the guilds of the barber-surgeons, which were to be found all over Europe from the beginning of the fourteenth century on. The barber-surgeons fulfilled a very important function in society. They were nearer to the people than the physicians. People of some means had their barber, who came to see them every morning. These barbers not only shaved their clients and cut their hair but performed venesections at regular intervals and were the advisers of the whole family in all matters of cosmetics and personal hygiene. The diseases of the skin therefore belonged in the realm of the surgeon. When syphilis was observed toward the end of the fifteenth century, the surgeons were the first to treat the new disease, and they were the first to apply mercury, which they used for other cutaneous eruptions.

In the middle of the thirteenth century, the Collège de St. Côme et St. Damien was organized in Paris for the training of surgeons. It was governed by the king's own body-surgeons, who at the same time gave free consultations in the hospital, the Hôtel-Dieu. History knows of many conflicts between those surgeons of higher training and the surgeons who merely went through an apprenticeship.

PARACELSUS IN THE LIGHT OF FOUR HUNDRED YEARS



WHEN Paracelsus came to Salzburg, four centuries ago, he was only forty-eight years of age but he was an old man, sick, tired, and worn. If you look at the picture that Augustin Hirschvogel made of him three years before his death, you will notice that this is the face of a man who had struggled all his life and had become embittered, of a man who had been fought and derided. He had tramped all over Europe, and now he was nearing his end.

Why did Paracelsus go to Salzburg in 1541? He had written a great many books on a great variety of subjects, medical, scientific, philosophical, and theological, but he had succeeded in having only a very few printed. Of his major works only one, his *Surgery*, a book that discusses not operations but the treatment of wounds and other surgical diseases, had found a publisher and an audience. Now, in the summer of 1541, he had some hope that in Salzburg he would find patrons and would be able to have a few more of his books issued in print.

It was too late, however. When he came to the city he was a sick man.

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I would like to locate Paracelsus in space and time, and I think that this will help us to draw a more vivid picture of his personality. Let me take you to Switzerland. If from the city of Zurich—"hortus deliciarum, nobile Turegum"—you follow the left shore of the lake, you will come to a mountain, the Etzel. From the top of it you have a superb view of the snow- and ice-covered peaks of the Alps, and to the east, right at your feet, you see a lovely rolling landscape with hills, woods, pastures, and orchards. In the sixteenth century, however, most of the region was covered with forests. Passing the Etzel, a pilgrims' road leads through to the Benedictine Abbey of Our Dear Lady of Einsiedeln. It had been founded in the ninth century, had developed into a cultural center, and was a famous place of pilgrimage where a Black Virgin was worshipped. A fire once had destroyed the monastery and church; through a miracle the statue of the Virgin was not burned but it turned black. Before you come to the abbey you cross a wild gorge through which a mountain river, the Sihl, flows in cascades. A wooden bridge crosses it, and right at its entrance stands a house which is an inn today and was one in the fifteenth century. To this place a young physician came late in 1491 or early in 1492. His name was Wilhelm Bombast von Hohenheim. He was the impoverished scion of a noble family of Suabia. As he had to make a living, he studied medicine, probably in Tübingen, and came to Switzerland to practice. He married a girl from the region, a member of the Ochsner family. They both came from the same Alemannic stock, a sturdy race of hard-working people, fighters who made excellent soldiers. They were not "woven of silk" as Paracelsus once said, but "of coarse linen." They had the unrest and curiosity common to many mountain people. When you grow up with a mountain in front of you, the moment invariably comes when you want to know what is beyond it. Some day you climb it, and then you see other valleys and more mountains. And you go on and on until you reach other lands. This has driven many Swiss into foreign services and beyond the seas.

Dr. Bombastus von Hohenheim settled down near Einsiedeln and practiced on the pilgrims' road. Two hundred thousand pilgrims still worship the Black Virgin annually. They come by train today, but in the fifteenth century they followed the road that crosses the Sihl. They all passed the doctor's house, and many of them, weary and sick from long traveling, must have called on him.

Towards the end of 1493, two years after he had started his practice, Dr. Wilhelm von Hohenheim had a son born to him. His Christian

king. He was never married, and congratulated himself on being a bachelor. He seems to have had a special antipathy for the ladies of Montpellier. He begins his book by giving a short treatise called *Doctrina et Ars Sciendi Computare per Figuras Algorismi*, which is an instruction on how to count with Arabic numerals. Then, as in most surgical textbooks, follows an anatomic treatise. The second book discusses wounds and ulcers, the third describes abscesses and skin diseases, and the fifth is an *antidotarium*, a collection of prescriptions used by the surgeons. The fourth book was to have discussed fractures and dislocations but was never written.

Throughout the book, but particularly in the beginning of the second section, Mondeville makes general remarks on the practice of surgery. There are two gates, according to him, that lead into surgery. One is the theory that one learns by reading and discussing, and the other is practice that one acquires by assisting a surgeon for a long time. Whoever wants to enter surgery must have four qualities: he must not be afraid of evil smells, he must cut or destroy boldly like an executioner, he must know how to lie in a courteous way, and, finally, he must know how to extract a gift or money from his patients.

A question often discussed was as to the superiority of medicine or surgery. Mondeville obviously is quite definite on the subject (p. 117):

Surgery undoubtedly is superior to medicine for the following reasons: 1. Surgery cures more complicated maladies, such as toward which medicine is helpless. 2. Surgery cures diseases that cannot be cured by any other means, not by themselves, not by nature, nor by medicine. Medicine indeed never cures a disease so evidently not by nature, nor by medicine. Medicine indeed never cures a disease so evidently that one could say that the cure is due to medicine. 3. The doings of surgery are visible and manifest, while those of medicine are hidden, which is very fortunate for many physicians. If they have made a mistake, it is not apparent, and if they kill the patient, it will not be done openly. But if the surgeon commits an error while performing an incision on the hand or arm, this is seen by everybody present and could not be attributed to nature nor to the constitution of the patient.

The following passages gives a graphic picture of relationships between surgeon and physician (p. 99):

Even in the case of a strictly surgical disease, if a sly physician has been called first, never will a surgeon see the case. More than that, the physician will tell the patient, "Sir, it is evident that the surgeons are vain and pompous people. They don't know anything about reasoning and are completely ignorant. If there is anything they know, they got it from us, the physicians. They are bad and cruel people, and ask for and receive huge fees. On the other side, you, sir, are feeble, inclined to be sick and delicate, and the expense involved in calling a surgeon could affect you

industry, was equally opposed. Doubts were expressed concerning the words of Aristotle, Galen, Avicenna, whose authority had been unchallenged during the Middle Ages. The discovery of the world became a great experience. New continents, new races of mankind, new species of animals and plants, and new diseases were found of which there were no descriptions in the writings of the Greeks.

Paracelsus thus was born in a period of expansion, discovery, and rebellion. His early training was different from that of other physicians. His first teacher was his father, who not only taught him to read and write but made excursions with him to study plants and animals and minerals. He took him along to the sickbed of patients. Together they explored the nature that surrounded them. Paracelsus remained deeply attached to his father throughout his life. He knew that the father would understand him when the whole world was deriding him. In the *Grosse Wundarzney* he remembers his early teachers: "First Wilhelmus von Hohenheim my father who has never abandoned me; Bishop Erhart and his predecessors of Lavanttal, many abbots of Sponheim."

In 1502 the family left Einsiedeln and moved to Carinthia where the father became municipal physician of the mining town of Villach. There has been some speculation as to the reasons why Wilhelm von Hohenheim should have left Einsiedeln. I think the explanation is very simple. The pilgrims were poor, and so were the woodchoppers who lived in the region. They needed a doctor, to be sure, but could not provide a living for him. Paracelsus' father, like all physicians of the day, was eager to obtain a salaried position that would guarantee him a minimum income. And this he found in Villach where he remained until the end of his life. There was a Benedictine abbey in that neighborhood too, the Abbey of Lavanttal, where the young Paracelsus could get instruction. But there were also mines, a mining school and smelting works in which he used to spend much time acquiring experience in chemistry such as few people and certainly no physician had. He wanted to be a doctor like his father and never felt any hesitation about it, but in order to be a doctor he had to go through the regular curriculum of the schools. It seems likely that he studied the arts at the University of Vienna and medicine in Italy, at the University of Ferrara. His chief teachers were Manardus and the great humanist Leonicensio who was a rebel also and had written a book, *Plinii ac Plurium Aliorum Auctorum . . . Errores Notati*. We know little about this period of Paracelsus' life, but from later statements in his writings we can safely conclude that his university years were a bitter

He will examine superficially, and will find excuses and delays. If he has received his fee, things are different. In such a case, the blind see, the lame run, because they are bound by the benefits they received.

The surgeon must have five things in mind: first, his fee; second, to avoid gossip; third, to operate cautiously; fourth, the malady; fifth, the strength of the sick man.

The surgeon must not be fooled by external appearances. The wealthy people when they go to see a surgeon dress in poor clothes or, if they are richly dressed, will tell stories in order to reduce the surgeon's salary. When they find the surgeon assisting poor people they say that charity is a flower and that the surgeon is bound to help the poor. But they will never admit that they are bound to do the same. Therefore I told them repeatedly, "You have to pay us for yourselves and for three people, so that I may cure them after I have cured you." But they keep quiet, and I have never found a man rich enough or, rather, honest enough, whatever his status, religious or not, who had been willing to pay what he promised without being compelled and urged to do so.

Mondeville is fully aware of the importance of psychologic factors in surgery. The patient has to be kept in good spirits. His mind must be cheered, and this can be done by having musicians play for him or by promising a quick recovery. The surgeon must not be afraid to lie if this benefits the patient (p. 144). For instance, if a canon is sick, tell him that his bishop has just died. The hope of succeeding him will quicken the recovery. Or dreams should be interpreted in such a way as to have a beneficial influence on the sick man.

Mondeville's recommendations may seem unethical to us. They were not to the people of his time. Nobody would object if a carpenter or a blacksmith discussed the question of fees openly, and surgery, until very recent times, was a craft also.

very often had twenty or more ingredients. Paracelsus opposed this poly-pharmacy and pointed out that in such remedies one drug neutralizes the other. His recipes were simple, consisting of few drugs. He was always anxious to find what we call today the effective principle. His experience in the field of chemistry led him to apply metals and other mineral drugs. He made extensive use of compounds of sulfur, lead, antimony, mercury, iron, and copper. He used such potent drugs as opium very frequently. Many of his remedies did not fit into the Galenic theory, which to him was a proof that the theory was wrong and that the action of drugs must be explained on different principles. It is hard to tell whether experience drove him to apply gold, pearls, corals, and similar remedies, or whether this was the result of his astrological views.⁴

Paracelsus undoubtedly was a good doctor who got results where others failed. He was a better doctor than most of his contemporaries because he followed two great teachers, *experientia ac ratio*. Observation and correct reasoning are still the basic methods of medicine. Deeply rooted in the Middle Ages, Paracelsus was nevertheless a man of the Renaissance who revolted against the traditional authorities. Not *perscrutamini scripturas*, but *perscrutamini naturas rerum*. In other words, medical research should not consist of the exploration of books and their interpretation according to Aristotelian logic, but should be scientific research.

Paracelsus wanted to be more than a good practitioner. He wanted to understand things. Why is there disease in the world? What causes disease? What is disease? Why does a man wither and die? Why does a man become insane? What is man? Paracelsus travels, treats patients, reflects on what he sees and writes about it. He did not write in Latin, which was a foreign language. Whoever thought in Latin thought in the traditional terms of scholasticism. Paracelsus thought in his mother tongue, Alemannic German, and wrote in the same language. And when he did not have a term available to express what he meant, he made new terms. Some of his writings were written for surgeons and had to be in the vernacular, but his theoretical writings in which he addressed himself to everybody were written in German also.

The most inspiring book that Paracelsus ever wrote is the *Volumen Paramirum*. He worked on it for many years, completed it around 1530, but it was not published before 1562. It is the ripest fruit of Paracelsian thought, a philosophy of medicine as challenging today as it was then. It

⁴ Henry F. Sigerist, "Laudanum In the Works of Paracelsus," *Bulletin of the History of Medicine* 9:530-544, 1911.

eleventh century Constantine of Africa devoted a chapter of his *Pantechne* to it, "De His Qui Coire Non Possunt."⁵ The same text with additions was wrongly attributed to Arnald of Villanova and was published in his *Opera Omnia*.⁶ Constantine's text with or without additions is frequently found in medical manuscripts as an independent anonymous treatise. It has been published and discussed by Gerda Hoffmann in an excellent dissertation.⁷

In my studies on the medieval medical manuscripts of Montpellier⁸ I found in the fifteenth century manuscript H 277, fol. 60^v, a version that is mentioned but was not used by Gerda Hoffmann. This may justify its publication here, although it follows rather closely the text of other manuscripts. I am adding an English translation and a few remarks on its content in relation to the *Malleus Maleficarum*.

TEXT

Incipit libellus de hiis qui maleficiis impediti cum uxoribus suis coire non possunt.

Sunt quidam qui maleficiis diabolicis impediti, cum uxoribus suis coire non possunt, de quorum sufragio nolumus nostrum librum enudare, quod medicamentum ni fallor est sanctissimum.

Igitur si hoc alicui contigerit, speret in domino et ipse dabit benignitatem. Sed quia maleficia sunt multimoda, oportet ut de hiis disputemus. Maleficiorum enim quedam de animatis fiunt, ut testiculi galli si sint suppositi lecto cum ipsius sanguine, efficiunt ne concumbant in lecto iacentes. Quedam karacteribus scriptis ex sanguine vesperilionis. Quedam vero de inanimatis, ut sicut si nux vel glans separentur, quarum medietas ex una parte vie, altera ex altera, unde sponsus et sponsa pergere debent.

Sunt et alia que de granis fabarum conficiuntur, que neque aqua calida molificantur nec igne coquuntur, quod maleficium pessimum est si quattuor illarum vel in tecto vel in via vel super hostium vel infra ponantur.

Sunt et alia que sunt metallica sicut que fiunt ex ferro vel plumbo, ex ferro sicut que fiunt ex acu cum qua mortui suuntur vel mortue. Sed quia hec sunt diabolica, et maxime sunt in mulieribus, aliquando divinis auxiliis aliquando humanis curantur.

Igitur si sponsus et sponsa supradictis maleficiis conturbentur, sanctius est de hiis discernere quam silere, quia si non succurrantur, separantur et sic degenerantur, et hoc malum exercentes, non solum in proximis sed etiam in spiritu sancto peccare videntur.

⁵ *Omnia Opera Ysaac*, Lugduni, 1515, fol. 117^v.

⁶ *Arnaldi de Villa Nova Remedia Contra Maleficia*, Basileae, 1585, 129.

⁷ "Beiträge zur Lehre von der durch Zauber verursachten Krankheit und ihrer Behandlung in der Medizin des Mittelalters," *Janus* 37:129, 179, 211, 1933.

⁸ See H. E. Sigerist, "Early Mediaeval Medical Texts in Manuscripts of Montpellier," *Bulletin of the History of Medicine* 10:27, 1941.

good health, but from these four spheres may come diseases, and man then returns to the normal condition in the fifth sphere, the sphere of God, *ens Dei*.

In other writings Paracelsus explained more specifically the material process of health and disease. The human body does not consist only of four elementary humors, blood, phlegm, black and yellow bile; nobody will deny their existence, but they do not play the part attributed to them by the Galenic school. What is important is that in every organ three principles can be found, the combustible, the volatile, and the incombustible, which remains as an ash. Paracelsus named these three principles sulfur, mercury, and salt. And to the force that makes an organism alive, the vital principle, he gave the name *archaeus*.

From the few remarks just made, it becomes apparent that Paracelsus was a vitalist and spiritualist. A deeply religious man, he was basically a mystic. But he was a scientist as well, better versed in chemistry than most of his contemporaries, and in his system he endeavored to combine spiritualism with modern science. It was a time that was aiming at complete systems that would explain all phenomena of life in health and disease. It had not yet learned the self-imposed limitations of modern science. It refused to admit that there were things in nature not yet known.

The doctrine of Paracelsus was new and very different from that of traditional medicine. It was in sharp opposition to the scholastic doctrine. More and more Paracelsus felt that he had a mission to carry to the world, that medicine must be "reformed" and that it was his task to be its Luther. He felt a strong desire to settle down, to have his books printed, and to teach—to teach regular students and not the vagabonds who had accompanied him at times on his wanderings, many of whom had come to a bad end. In 1524 he went to see his father in Villach and then established practice in Salzburg. He had hardly started when the Peasants' Wars broke out. Although he was not directly involved, his sympathies were all with the rebellious peasants. He was arrested, released, but there was no staying in Salzburg. He moved on to Strasbourg, a city famous for its printing houses and for its school of surgery, situated in the heart of Europe. He applied for citizenship there and was registered on the Burger's Roll at the end of 1526.

Strasbourg was not far from Basle, in those days a center of humanistic studies with a university and publishers of world reputation, attracting artists and scholars from far and wide. There was much traffic between the two cities, and the reputation of Paracelsus soon spread to Basle. Not

He will be merciful. Since, however, there are many kinds of spells, it is necessary that we discuss them. Some spells are made of animated substances such as the testicles of a cock. If they are put under the bed with blood of the cock, they bring it about that the people lying on the bed cannot have intercourse. Some are made of letters written with the blood of a bat. Some are made of inanimate substances, for instance if a nut or an acorn is divided in two, and one half is put on one side, the other on the other side, of the road along which the bride and bridegroom must proceed.

There are others also which are made from beans which are not softened with hot water nor cooked on the fire. This spell is very bad if four such beans are placed on the roof or on the road or over or under the door.

There are others also which are of metal, such as those that are of iron or lead, for instance, the iron ones made of the needle with which the dead men or women have been sewn. And because these spells are devilish and are particularly in women, they are sometimes cured by divine, sometimes by human measures.

If therefore bridegroom and bride are disturbed by the above-mentioned spells, it is better to talk about them than to keep silent, for if the victims are not succored they are separated and thus disgraced, and doing this evil they seem to sin not only against their relatives but also against the Holy Ghost.

If we wish to extirpate the spell properly, we must look out: if the above-mentioned spell is under the bed, it must be removed. But if the author of this spell removes it in daytime and puts it back at night, or vice versa, then bridegroom and bride must acquire another house and lie down there.

If the spell is made of letters, which is recognized by the fact that bridegroom and bride do not love each other, one must search above and under the threshold of the door, and if something is found it must be taken to the bishop or priest. If not, one must do what is indicated below.

If a nut or an acorn are the cause of this spell, the woman shall take a nut or an acorn and divide it in two. And with one half the man shall proceed on one side of the road and deposit it there; the woman, however, shall put the other half on the other side of the road. Thereupon bridegroom and bride shall take both parts of the nut without having removed the shell. And then the nut shall thus be made whole again and shall be kept for seven days. Having done this they shall have intercourse.

If, however, it happens on account of beans, it can be cured with divine rather than human means. If it is on account of the needles for the dead, the spells must be sought either in the pillow or in the mattress. If they are not found, the victims shall lie together in another house.

Bile of a male dog purifies the house and brings it about that no evil remedy be brought to the house.

Sprinkle the walls of the house with dog's blood, and it will be liberated from every spell.

If bridegroom and bride carry bile of a fish and particularly of zangarinus (that is lucius) along in a box made of juoiper, and if when they go to sleep they pour some on burning coals and are fumigated therefrom, all spells mentioned above vanish.

writers, compile these books out of extracts from Hippocrates or Galen, but in ceaseless toil I created them anew, upon the foundation of experience, the supreme teacher of all things. If I want to prove anything, I shall not try to do it by quoting authorities, but by experiment and by reasoning thereon. If therefore, my dear readers, one of you should feel the impulse to penetrate these divine mysteries, if within a brief space of time he should want to fathom the depths of medicine, let him come to me at Basle, and he will find much more than I can utter in a few words. To express myself more plainly, let me say, by way of example, that I do not believe in the ancient doctrine of the complexions and the humours, which have been falsely supposed to account for all diseases. It is because these doctrines prevail that so few physicians have a precise knowledge of illnesses, their causes, and their critical days. I forbid you, therefore, to pass a facile judgment upon Theophrastus until you have heard him for yourselves. Farewell, and come with a good will to study our attempt to reform medicine. Basle, June 5, 1527."

This was indeed an unusual document and a regular challenge to the medical faculty. The professors were prejudiced against him anyway. They had not been consulted when he was called, and considered him an intruder. According to the custom of the time, he was invited to present his credentials, but he had no diplomas to show. He must have lost them during his wanderings. Paracelsus did not make it easy for the faculty to accept him. During his many years of traveling he had developed habits that were shocking to respectable professors. He did not wear an academic gown and a doctor's bonnet, but used to go around with the broad-rimmed hat of a coachman that Holbein has depicted in his portrait. He drank heavily, used coarse language, and did not behave at all like a professor.

In an atmosphere of hostility he began his lectures with keenest enthusiasm. He lectured during the summer term of 1527, during the holidays, and during the winter term of 1527-1528. He stuck to his program and did not interpret the Greek and Arabic classics in the customary way. He lectured on pathology and therapy, on the preparation of remedies and their prescription, on diagnosis by means of the pulse and the urine, on cathartics and phlebotomy, wounds and surgical diseases. The medical lectures he gave in Latin, the surgical ones in German, although he was addressing medical students. This too was a shocking innovation.

The faculty had taken up the challenge and had forbidden Paracelsus the use of their lecture hall. But the Town Council, his patron, backed

More specifically witches were supposed to "impede and prevent the power of procreation" in the following way:¹³

Extrinsically they cause it at times by means of images, or by the eating of herbs; sometimes by other external means, such as cocks' testicles. But it must not be thought that it is by the virtue of these things that a man is made impotent, but by the occult power of devils' illusions; witches by this means procure such impotence, namely, that they cause a man to be unable to copulate, or a woman to conceive.

The *Malleus Maleficarum* states that "God allows the devil to afflict sinners more than the just,"¹⁴ and in the case of impotence "the infirmity we are considering can only be due to the sin of incontinence. For, as we have said, God allows the devil more power over that act than over other human acts, because of its natural nastiness, and because by it the first sin was handed down to posterity."

The victim of a spell was therefore frequently branded as a sinner. The remedies were five:¹⁵

In conclusion we may say that there are five remedies which may lawfully be applied to those who are bewitched in this way; namely, a pilgrimage to some holy and venerable shrine; true confession of their sins with contrition; the plentiful use of the sign of the Cross and devout prayer; lawful exorcism by solemn words, the nature of which will be explained later; and lastly, a remedy can be effected by prudently approaching the witch. . . .

Johann Weyer, who in his *De Praestigiis Daemonum*, published in 1563, so courageously opposed witch-hunting, discussed also the question of impotence.¹⁶ He pointed out that such a condition could result from various natural causes and that it could also be produced incidentally by drugs. One should therefore not think of sorcery whenever such a case occurs, nor accuse innocent people. Weyer did not deny that the devil could disturb a man's generative function, but he was most violent in affirming that the devil would certainly not need the intermediary of some filthy old wench. He discarded as lies various stories told about impotence caused or cured by magical means. In the case of a gentleman who was cured by anointing himself with bile of a raven and some kind of an oil after a recipe of the book of Cleopatra,¹⁷ Weyer's conclusion

¹³ Part ii, question 1, chapter 6, p. 118.

¹⁴ Part ii, question 2, chapter 2, p. 168.

¹⁵ Part ii, question 2, chapter 3, p. 170.

¹⁶ Book iv, chapter xx.

¹⁷ Various books on the subject of gynecology and cosmetics were transmitted under the name of Cleopatra, and some of them were printed in the Renaissance.

you. . . . how do you like *Cacophrastus*? This dirt you must swallow at any rate."

The first pillar of medicine is philosophy, by which Paracelsus does not mean the traditional scholastic philosophy of the Middle Ages but the science of nature, what in the seventeenth century was still called the "new philosophy." "Who could be a better preceptor than nature herself?" "As then the physician should grow out of nature, what is nature but philosophy, and what is philosophy but invisible nature?"

The second pillar is astronomy. Heaven is to the creature what a father is to his son. Heaven works in us, and we cannot understand mankind unless we recognize its cosmic subjection and its time. The third pillar is chemistry. Throughout his life Paracelsus was an ardent chemist, and never traveled without a set of chemical apparatus. He gave chemistry a new purpose, which was not to create gold or silver or the elixir of life, but to prepare effective remedies and to reveal biological processes. "Nature is the arch-chemist and we must imitate her, otherwise we are no more than kitchen sluts." In other words, he had a clear conception of the fact that many biological processes are nothing but chemical reactions. The fourth pillar of medicine, finally, is virtue. The foundation of medicine is love. No man can be a good physician unless he has a highly ethical concept of his mission.

Since Paracelsus could not spread his gospel by word of mouth, he had to do it in writing, and in the following years he worked feverishly putting his experiences on paper. He wrote a large number of monographs, one on diseases of miners, the first monograph on the subject, another book on mental diseases, studies on gout and other diseases of metabolism as we would call them. He wrote a large number of pharmacological books in which he described his remedies and how to prepare them. He wrote on the treatment of wounds and other surgical diseases, a subject in which he was particularly experienced. He wrote on mineral waters and the curative power of health resorts. But as a writer, too, he was bitterly disappointed. Publishers refused to print his books. Nürnberg, one of the most enlightened and progressive cities at the time, was the only place where he succeeded in having some of his writings published. There, a short treatise of eight leaves on the treatment of syphilis with guaiac wood was published in 1529, and in 1530 the same publisher, Friderich Peypus, published his monograph on syphilis. The disease was widespread in those days, and literature was welcome. In 1535 Paracelsus published, somewhere in Switzerland, a short treatise on the baths

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RENAISSANCE, BAROQUE, AND AGE OF
ENLIGHTENMENT MEDICINE

the Renaissance, men like Vesalius, Fracastoro, Paré, we find that his contribution was of a totally different kind. Vesalius created a new descriptive human anatomy which became the foundation of a new system of medicine. The work of Vesalius has been assimilated by medicine and is dead now. The same applies to Fracastoro and Paré. Fracastoro wrote a classical monograph on contagious diseases. We know that most of his observations were correct. They have been accepted in course of time, and much has been added to the subject since then. Paré became the father of surgery. We venerate him as such, but if we read his works we do it for purely historical reasons.

Paracelsus holds a totally different position in the history of medicine. Like the others, he too made a number of definite contributions to medicine and improved its equipment and techniques, particularly in the field of therapy. He will always be remembered for the introduction of many chemical remedies. But he did infinitely more in that he attacked the basic problems of the healing art, asking for the *how* and *why*. He was a scientist in search of a philosophy of medicine. He used the experiences of medicine and science as materials in order to create a synthesis. He wanted to understand the world in which he was living and man's part in it in health and disease. His approach to the problems was that of a vitalist and spiritualist. Descartes was soon to show that there is another approach that leads to far-reaching conclusions.

Whether we agree with Paracelsus or not, we cannot read his books without being strongly stimulated or challenged. The problems he discussed are not solved yet, and this is why his books are still alive today. They make us realize how primitive and sketchy our present theory of medicine is. We have accumulated a large number of scientifically established facts. They are very useful and are largely responsible for the progress of medicine. But we need a philosophy to connect the facts. This is where Paracelsus—and Descartes—can still teach us a great deal.

THE FOUNDATION OF HUMAN ANATOMY IN THE RENAISSANCE

WHEN we speak of the foundation of human anatomy, we immediately remember the names of two great Greek physicians who, at the end of the fourth and the beginning of the third centuries B.C., lived and worked in Alexandria—Herophilus and Erasistratus. Their names have survived the centuries and have become a part of our anatomical nomenclature. They were not specialists in anatomy, but all-round physicians whose writings cover the whole wide field of medicine. Herophilus was chiefly influenced by the school of Cos and wrote famous books on the pulse, on drugs, on midwifery; but then he also wrote a treatise on anatomy in at least three books. The fragments preserved show that he had a thorough knowledge of the anatomy of the eye, the membranes of the brain, the genital organs, and the duodenum, and credit is to be given him for his recognition of the true nature of the nerves. He dissected numerous animals and occasionally human bodies; according to an ancient tradition, even human vivisections were performed in Alexandria.

A still greater anatomist was to be found in Erasistratus. Fragments of his two works on anatomy contain good descriptions of the heart, the liver, and the brain; it was he who discovered that there are two kinds of nerves—sensory and motor. But he went still further. Being a student of Cnidos, where the tendency had always been to localize disease, he recognized that diseases have a seat, and that this seat has to be sought in the organs. In his dissections he had found anatomical alterations which

It was a chance experience that induced Paré to experiment with onions. The episode took place in Piedmont around 1537. Paré, at that time a young surgeon of twenty-seven years, was attached to the army of the Marshal de Montejan in the third war between Francis I and Charles V. He relates his experience in the following words:³

One of the Marshall of Montejan his Kitchin boyes, fell by chance into a Caldron of Oyle being even almost boyling hot; I being called to dresse him, went to the next Apothecaries to fetch refrigerating medicines commonly used in this case: there was present by chance a certaine old countrey woman, who hearing that I desired medicines for a burne, perswaded mee at the first dressing, that I should lay to raw Onions beaten with a little salt; for so I should hinder the breaking out of blisters or pustules, as shee had found by certaine and frequent experience.⁴ Wherefore I thought good to try the force of her Medicine upon this greasy scullion. I the next day found those places of his body whereto the Onions lay, to bee free from blisters, but the other parts which they had not touched, to be all blistered.

The result was striking, but Paré did not draw any conclusions from a single observation. Soon thereafter, however, he had another opportunity to treat a serious burn, and the result fully confirmed his previous observation:⁵

It fell out a while after, that a German of Montejan his guard had his flasque full of Gunpowder set on fire, whereby his hands and face were grievously burnt: I being called, laid the Onions beaten as I formerly told you, to one half of his face, and to the other half I laid medicines usually applied to burnes.⁶ At the second dressing I observed the part dressed with the Onions quite free from blisters and excoriation, the other being troubled with both; whereby I gave credit to the Medicine.

This was a convincing experiment, but Paré was not satisfied yet and continued his experiments. When during the same campaign the castle of Veillaine was taken by storm, a number of soldiers were burned by a train of gunpowder. Paré treated some of them with chopped raw onions to which some salt had been added and the others with the traditional ointments. Again the difference was striking, and, from now till the end of his life, Paré was convinced of the value of onions in the treatment of

³ *The Workes of that famous Chirurgeon Ambrose Parey* translated out of Latine and compared with the French by Th. Johnson, London, 1634, p. 410.

⁴ The French original text is much more picturesque: "Je demanday à ladite vieille si autrefois l'avoit expérimenté, elle me lura en son iargon, Si messé, a la se de Dé," *Oeuvres Complètes d'Ambroise Paré*, par J.-F. Malgaigne, Paris, 1840, vol. II, p. 128.

⁵ Johnson, *op. cit.*, p. 410; Malgaigne, *op. cit.*, vol. II, p. 128.

⁶ The original French text says "à la moitié du visage," while the English translation made from the Latin translation has "to the middle of the face." I have corrected the translation after the original text.

as was the case down to the nineteenth century—the surgeon could operate very successfully with a limited knowledge of the human body. Ancient anatomy, then, was almost entirely animal anatomy. The Alexandrians occasionally described human organs, but never *in situ* and never systematically. First of all, anatomy had an entirely different place in the system from what it has today. One studied the structure of the body because it was a part of the realm of nature, just as one studied plants or minerals and geography. A doctor did not study anatomy because he thought it imperative, and this was because Greek medicine had an essentially different structure from that of our medicine today. The symptoms of disease were not traced back into the organism. The concept of disease was not ontological, and, if one systematized, one did not systematize disease but rather, different types of man. Erasistratus has a unique position in Greek medicine. He took the road that we have followed, but his attempt to establish an anatomical system of medicine failed, just as Aristarchus had found no followers for the heliocentric system. Another school grew out of Alexandria—the school of the Empiricists, who declared openly that anatomy was of no use to the doctor. The same view was shared by another very popular school, the Methodicists. And as the ancient world grew old Hippocrates became still more the dominating figure—Hippocrates, who had cured without anatomy.

The foundation of human anatomy, therefore, was the accomplishment of our western medicine. There, a necessity for the doctor to have an intimate knowledge of the human body was overwhelmingly felt, which eventually broke down completely the taboos that surrounded the human body. The body of a diseased man was always considered to be within the realm of the physician. Not so the cadaver, the attitude towards that being the result of esthetic, ethical, and religious conceptions. The cadaver was thought to be something holy, or impure, not to be touched without necessity. The Christian attitude, contrasting sharply body and soul, was by no means favorable to the development of anatomy. And yet, in spite of all this, the barriers were broken. From the beginning of the fourteenth century on, human cadavers were dissected, first in Bologna, then in other universities, and several times a year. Such anatomies were held, but they did not serve research purposes; they were, rather, mere demonstrations illustrating the textbooks. One was still convinced that the Greeks had known all there was to know about the human body, and one dissected in order to reach a better understanding of their statements.

stirring it carelessly with their hands until "the powder upon a sudden became on fire, wherewith they were most greivously burned, both hands and face, and also their bodies, and their clothes were set on fire, which caused them to make a most lamentable crying." Glowes was called and applied to the parts that were blistered, particularly the hands and face, three times a day for four days, a remedy the composition of which was:

Rec. Salis com. ℥. ss.
Succi Cepae. ℥. iiii.
Misce.

The remedy, in other words, consisted of four ounces of onion juice in which half an ounce of salt had been dissolved. Where the "skinne was burned off and the parts made rawe and paynfull" Glowes did not apply the onion juice but one of the traditional ointments. The cure was finished "without blemish or signes of any burnings."

In another passage⁹ Glowes uses onion juice combined with linseed-oil or varnish:

Rec. Succi cepae. ℥. ii.
Olei lini vet. or Varnish. ℥. i.
Misce.

Glowes was familiar with Paré's work and quotes him repeatedly. It is, therefore, very likely that he learned the onion treatment of burns from him.

In the seventeenth century this treatment was still in common use. Richard Wiseman (1625-1686), surgeon to four kings of England, mentions it in the *Appendix to the Treatise of Gun-shot Wounds* that he wrote particularly for the benefit of the "Sea-Chirurgions, who seldome trouble their Cabbins with many Books." It contained a chapter "De Ambustis, or, Of Burns with Gun-powder, etc.," specially written since "Burning by Gun-powder and other materials do too frequently happen at Sea." Discussing the general treatment of burns he says:¹⁰

The Indications of Cure are two kinds: viz. either by Refrigerants to bath or anoint the Part, until the Heat be off, and the Eschar separated, and then to digest and cicatrize; or by calefactive Medicaments to relax the Skin, and resolve and dissipate it, which by accident will assuage the heat and Burning. The Refrigerants are, aq. solani, plantag. hyoscyam. lac cbutyratum; and all the cooling Juices and Unguents, as unguent. album, nuiritum, populeum, rosai. etc. These must be used warm.

⁹ *Op. cit.*, p. 4.

¹⁰ Richard Wiseman, *Several Chirurgical Treatises*, ed. 2, London, 1686, p. 440. The first edition was published in 1676.

studied from a critical standpoint. In endless books, men tried to solve the riddle of his personality. Most of them made the mistake of measuring him on the wrong yardstick; Benedetto Croce from the point of view of speculative idealism, and Olschki from the point of view of modern positivism. Leonardo has to be studied as a man of the Renaissance; this has been done in an admirable way by Ernst Cassirer. Leonardo represents a type of amateur scientist. He never went through a university; he was an illegitimate child. He was a strong opposition to the traditional scholastic science of the time, constantly making sharp distinctions between the discoverers and mere imitators. His work marks a shifting from books to the book of nature, from revelations in words to revelations in works. Mathematics to him formed the very heart of all knowledge. All knowledge was nothing more than a measuring, and everything was expressed in proportions. Proportion was the medium of recognition, and proportion was not only a logical and mathematical but an esthetic conception as well. This formed the link between the scientist Leonardo, endeavoring to investigate nature, and the artist Leonardo, recreating nature in his work. Nature is the realm of perfect forms and is ruled by necessity. The fact that Leonardo admitted to such a concept of natural laws made him a true scientist. Nature is dominated by reason. Experience and reason are not contradictions—they are two principles. Experience reaches its goal in mathematics, just as mathematics bears its fruits in experience.

Still, the study of man claims the first place in Leonardo's interest. Man is the primary object of his research. He studies the proportions of the human body, the plastic aspect of its outlines, but he goes further, stripping the skin, dissecting the body. Thousands of sketches are the result of his studies, which were intended for a complete book of anatomy that was to describe the structure of man from the very moment of his conception. Leonardo knew the medical literature of the day. Quite a few of his sketches are not the result of observation but illustrate statements he had found in books. However, he was never satisfied merely with what he read, but always went further, approached the cadaver, experimenting, dissecting, making notes and drawings.

Leonardo's anatomical work was never finished, and after his death his drawings were scattered to the winds. His whole life work, artistic and scientific, remained a torso, which is not to be wondered at, since it was an entire cosmos that he was attempting to recreate. Leonardo is a unique figure. A man of the Renaissance, to be sure, and yet hard to place in the

duction to the book I discussed his onion treatment of burns in some detail because it illustrated beautifully his entire mode of thinking and acting. I also strongly felt that such a man was not a fool and that a treatment that he applied and constantly found efficacious could not be a mere superstition. I thought that it would be worth while to investigate the treatment more closely and talked about it to my surgical colleagues. Some of them listened politely and smiled ironically: onions in surgery—a historian's ideal. Others were less polite and did not listen at all.

And then soon thereafter, in 1925, Edward C. Davidson introduced the tannic acid treatment of burns. The reports were so promising that there seemed to be no need for other methods. Then came the treatment with gentian violet and other antiseptics; then came the sulfa drugs. There really was no need to think of onions.

The present war with its mines and flame throwers has made the treatment of burns one of the most important problems of war surgery. It was found that all existing treatments had great shortcomings,¹³ and the *Circular Letter No. 15* of January 11, 1943, from the office of the Surgeon General of the U. S. Army gave first place to the treatment with boric acid ointment, emphasizing the importance of firm pressure especially in burns of the hands and face. It seemed that we had reverted to treatments used in the last war.

But now, quite recently, news was received from the Soviet Union about some very interesting experiments performed—with onions. Professor B. Tokin of the Tomsk State University and his co-workers A. G. Filatova, A. Kovalenok, and I. V. Toroptsev found that a paste prepared from a small amount of freshly macerated onion emits volatile substances which within a few minutes kill yeast, protozoa, and bacteria exposed to them.¹⁴ The chemical nature of these substances has not been determined as yet, and Tokin tentatively designated them as phytoncides, or plant bactericides. They were also found to emanate from garlic, radish, mustard, and similar plants but are particularly strong in onions. Interesting results have already been obtained in the treatment of infected wounds.

In the light of these experiments of Soviet scientists, Paré's experience with onions acquires new significance, and I think it would be worth while to examine whether the onion phytoncides, whatever they may be, have any action on burns.

¹³ National Research Council, "The Treatment of Thermal Burns, *The New England Journal of Medicine*, 229:817-823, 1943.

¹⁴ See *American Review of Soviet Medicine* 1(3):236-250, February, 1944.

can still be seen at the University of Padua, the teacher and inspiration of Harvey; Giulio Casserio, who wrote a classic book on the auditory organs. Outside Padua, in Bologna, Rome, Naples, and, towards the end of the century, north of the Alps, anatomy became a more and more important object of research.

Vesalius' book was published in 1543, the same year in which Copernicus' *De Revolutionibus Orbium Cœlestium* appeared. In laying the foundation of human anatomy, Vesalius laid the foundation of modern medicine. The year 1543, therefore, marks the beginning of a new era. From then on, anatomy was the iron fundament of medicine. But, more than this, anatomy became a method of thinking. The history of medicine from Vesalius to our day is to a large extent the history of the application of anatomical methods. Step by step, one field after another was conquered by this new method. Physiology at the time of Vesalius was still speculative and philosophical in character. In the seventeenth century, anatomy developed into *anatomia animata*, and an anatomical physiology was born, working by means of experiments. In the eighteenth century, pathology became anatomical. A new ontological concept of disease had been realized, and disease from then on was attributed and bound to the organs. One saw that the symptoms of disease are the result of anatomic alterations in the organs. Diagnosis became diagnosis of the organs; percussion and auscultation were introduced as methods enabling the physician to observe anatomical changes. The last field that had to be conquered was therapy, which down to the middle of the nineteenth century still followed traditional lines. The final step was taken also and found its expression in the development of modern surgery.

Today this cycle has come to a certain conclusion; the anatomical method has been applied to all fields of medicine, and a new, a physiological, era has begun.

WILLIAM HARVEY'S POSITION IN THE HISTORY OF EUROPEAN THOUGHT

THIS year the medical world is celebrating the memory of a man who was born 350 years ago, and who 300 years ago, in Frankfurt am Main, had a small, unpretentious book published which brought about a turning point in the development of scientific medicine and biology. This was the English physician William Harvey who, in his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, described the circulation of the blood.

If the discovery of the circulation of the blood had only signified the solving of a medical problem, or the correcting of a centuries-old error, then I would not have chosen it as the subject for my speech. However, a much larger question of cultural history is involved. The problem of the movement of the blood illustrates the profound change taking place in scientific medicine from antiquity to modern times. The discovery of the circulation of the blood also shows with particular clarity how the general attitude of a period influences all creations of the mind and penetrates the most remote fields of human knowledge.

Much has been said and written about Harvey. His discovery has been praised in glowing words. And, as everywhere where real greatness is found, here also smaller minds were not lacking who, in pointing out

.....
Speech delivered on July 7, 1928, at the ceremony of the founding of the University of Leipzig.

On September 21, he felt that the end was near, called a notary, and drew up his will. An inventory of all his earthly possessions fills hardly two pages. He had some clothes, a few coins, a few jewels, gifts of wealthy patients. He bequeathed them to a few friends. His manuscripts he left to a barber-surgeon. He had always felt closer to the surgeons than to the academic physicians. The rest of his possessions he left to the poor. He had been one of them all his life. Three days later, on September 24, he died.

Who was this man? It is extremely difficult to give an adequate picture of him, for many reasons. Many of his books have not been published yet. In the authoritative edition of Karl Sudhoff,¹ fourteen volumes are devoted to the books on medicine and the philosophy of nature. They were to be followed by ten more volumes of theological writings, and of those only one has been issued so far. Paracelsus' theological writings reflect a very important aspect of his personality, and without them it is difficult to understand his other books. Paracelsus' language adds to the difficulty of interpreting his work. The great majority of his books were not written in Latin but in German, and not in the language of Luther but in an Alemannic German which is close to the dialects that are still spoken in Switzerland today. In the sixteenth century the German language was not yet developed to express matters of natural science. A number of medical books had been translated, mostly in the fifteenth century, but the majority of them were popular books for the layman or for the surgeon.² The translations of the Bible by Luther and Zwingli had enriched the language considerably, but there were no technical terms available to designate subjects of natural science. Such words had to be coined, and the interpretation of those we find in the works of Paracelsus is not at all easy.

Another difficulty is that Paracelsus, although a man of the Renaissance and a scientist, was deeply rooted in German medieval mysticism, and unless we know its literature we cannot attain a full understanding of Paracelsian thought.³

¹ Karl Sudhoff, *Theophrast von Hohenheim gen. Paracelsus Sämtliche Werke: I. Abteilung, Medizinische, naturwissenschaftliche und philosophische Schriften*, Munich, 1922-1933, 14 volumes.

² Karl Sudhoff, *Deutsche medizinische Inkunabeln*, Leipzig, 1908. [Studien zur Geschichte der Medizin herausgegeben, von der Puschmann-Stiftung an der Universität Leipzig. Heft 2/3.]

³ See the excellent study of Bodo S. Freiherr von Waltershausen, *Paracelsus am Eingang der deutschen Bildungsgeschichte*, Leipzig, 1936.

blood. Nourished by *spiritus naturalis*, a principle which we would say conditions the vegetative functions, the blood flows partly into the entire organism, partly through the vena cava into the right half of the heart. Here the blood stream divides, one part flowing into the lung and discharging the residues of the organism, the other part oozing through the septum of the heart into the left half of the heart. At this point important transpositions take place. The blood mixes with the air, which has reached the heart via the lung and the veins of the lung. The collision of these two substances creates the *spiritus vitalis*, a principle which to our way of speaking controls the animalistic functions. During this process, which can be compared to burning, bodily heat arises which in turn is regulated by breathing. The blood which flows into the whole organism from the left half of the heart via the aorta is entirely different from the blood of the veins, which carries another principle and contains air. Part of this blood flows into the brain and is nourished by a third principle, the *spiritus animalis*, which reaches the body via the nerves and fulfills the nervous functions.

The movement of the blood was not thought of as flowing in one direction, centrifugally, but rather as flowing mysteriously back and forth. The current of Euripos was taken as a symbol for this movement. This channel between the island Eubœa and the Greek mainland, in which the current in mysterious ways and seemingly without reason changed its direction sometimes several times within an hour, was a phenomenon of nature which had greatly intrigued the imagination of ancient scientists, and which was scientifically explained only a few decades ago.

If we regard this theory in its entirety, we find that it is very logically constructed. It explains much. It explains the difference between arterial and venous blood and between inhaled and exhaled air. It provides insight into the relationship between food, air, blood, bodily heat, and the organism. It recognizes blood as the carrier of all vital substances.

A characteristic of this theory is that it is purely qualitative and descriptive. No attempt is made to measure the qualities. The concepts of number and time are foreign to it. We are confronted with a scientific way of thinking which is totally foreign to us. The Middle Ages and the Renaissance maintained Galen's theory of the movement of the blood.

In the sixteenth century a profound change took place in scientific medicine, a change which was personified in the figure of Andreas Vesalius, the founder of human anatomy. Ancient anatomy had been animal anatomy. Now one was confronted with the enormous task of in-

name was Philip. But the father was a humanist, a keen botanist, and so he gave the boy in addition the name of Theophrastus, in memory of the student of Aristotle. When the boy grew up, he was blond and used to be called "Goldilocks" which in Latin is Aureolus. And so it happened that Paracelsus would sometimes call himself with full names Philippus Theophrastus Aureolus Bombastus von Hohenheim. Later, after having studied in Italy, he followed the humanist fashion and adopted the Latin name Paracelsus. What it actually means we do not know.

This is the setting in which the young Paracelsus grew up, a landscape that seems lovely to us today, but was awe-inspiring wilderness then with its steep rocks, dark forests, and long winters when the whole region was buried in snow. He grew up close to nature, but as a subject of the abbey also close to the church, fascinated and puzzled at times by its services and rites.

Paracelsus was born in 1493, the year when Columbus returned to Spain after having discovered a new world. It was a period of awakening all over Western Europe. The medieval world was a static world. Man was born into a status from which it was hard to escape. It was an authoritarian world, dominated by the Church. Salvation was the purpose of man's life, and all other considerations were secondary. It was the best possible world created by God for all time to come, and all aspects of life were dominated by authorities. This world, however, that seemed so firmly established began to crumble, and in the fifteenth century an attitude of revolt against authorities gradually developed. Trade increased, and people became wealthy who did not belong to the privileged classes. Feudalism began to disintegrate; the manor system declined. More and more free people were employed, working for wages. Guild masters became merchants. All this created a great demand for gold as a medium of exchange, and this in turn started the great voyages of discovery. They were not undertaken to satisfy an intellectual curiosity, but for commercial purposes, because the world needed gold and spices and other raw materials that were not found at home. A new economic order began to develop, which called for free trade, free competition, free initiative, and appealed to the individual in man. Such a world could not develop under the rigid regulations of the Middle Ages. The traditional authorities were opposed. The most powerful authority, the Church, was "reformed." The authority of the guilds that regulated all aspects of industrial life was broken. The authority of the medical faculties, which regulated the profession of medicine very much as the guilds controlled

A BOERHAAVE PILGRIMAGE IN HOLLAND



N September 8, 1738, Herman Boerhaave wrote to Dr. Mortimer, Secretary of the Royal Society, the following letter:¹

It is a year since age, application, and immoderate fatness have produced an utter ineptitude to any kind of exercise in such a heavy corpulent body, full of inert humours, and upon the least motion gasping for breath, with a pulse strangely irregular; but the most urgent symptom was the interruption, or stoppage of respiration on falling asleep, and the prevention of any rest by a sudden terrible sensation as of strangling. Upon which the abdomen and all the parts below it became dropsical; but notwithstanding the removal of these symptoms, there remain pain of the belly with great weakness and anxiety, a suffocating asthma; short are my slumbers, disturbed with dreams, the mind is incapable of any business; wearied with this conflict I gain no release, yet patiently wait the divine pleasure to which I am wholly resigned.

Two weeks later on September 23 between four and five o'clock in the morning he passed away. He was in his sixty-ninth year and would have reached the age of seventy three months later. When he died, Holland lost its greatest physician and the whole of Europe its clinical teacher.

It was obvious that the two-hundredth anniversary of the death of

Read before the Johns Hopkins Medical History Club on November 14, 1938.

¹ "Ex Epistolis Nondum Editis Analecta," in W. Burton, *An Account of the Life and Writings of Herman Boerhaave*, ed. 2, London, 1746, pp. 215-216, 69-70.

disappointment to him. He who had studied science in the fields, in the woods, and in mines, who had been in touch with patients from his early childhood on, found the universities still imbued with the spirit of scholasticism. The books, not nature, were in the foreground in all investigations. Anatomical studies were undertaken, but Vesalius had not yet appeared on the scene. Clinical instruction had not yet been inaugurated, not even in Padua. Most of the teaching was theoretical and consisted of the interpretation of texts. The ancient theories of disease were still accepted, and treatment followed traditional lines.

Paracelsus at this time was already too much of a personality to let himself be forced into the traditional pattern. If the universities could not teach him what he wanted to learn, other people would. Who? Barber-surgeons, old women, craftsmen, miners, abbots, scholars, or laymen. What difference did it make? You must learn from any source that you can tap. He realized, however, that he would have to travel, and from Italy he set out on a journey which with short interruptions was to continue all his life and which only death brought to an end.

Paracelsus mentions in his works many places visited on his peregrinations, and this allows us to reconstruct his travels to a certain extent. After having been all over Italy, he went to France, Spain, and Portugal, to England, Scotland, and Ireland, to Denmark and Sweden, then east to Lithuania and Poland. He visited Hungary, Rumania, and Croatia, was on the Greek islands of Rhodes and Samos, and went as far as Constantinople, Crete, and Alexandria. He covered an enormous territory, considering the means of communication of the time. And while he traveled he practiced medicine, learned from every source, and taught a few young people who followed him at times. He never missed a visit to mines or mineral springs. Wherever he went, he inquired about the diseases peculiar to the region, talked to the local doctors, to the surgeons, to plain folk, but he could also hold his own in discussions with bishops and scholars. He learned a great deal during these years of wandering, saw a great variety of diseases, learned to observe them under varied conditions, became aware of the great influence of the environment on man. And he also learned to apply new treatments. He developed his own therapy.

In the sixteenth century diseases were treated primarily with drugs. The pharmacological principles of Galen based on the theory of qualities were dominating. Physicians applied the Galenic *materia medica* that had been enriched considerably with Arabic drugs. Compound remedies

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is not easy to read, and a good English translation should be made of it. It is written in the terminology of the day, but if we take the trouble to interpret it the book impresses us as very modern.⁵ The *Volumen Paramirum* discusses the five spheres that determine man's life in health and disease. Man is a microcosm. He is in small what the world is in large. The world is God and nature, and so is man. If we wish to understand man, we must study God and nature.

The first sphere is *ens astrale*. What does that mean? The stars move according to eternal laws, so does man's life. The constellation characterizes a given moment. Every individual has his moment, his historical time which affects his life in health and disease. This is a very fine thought. A child born in Spain today will be exposed to more and different diseases than a child born in 1900. A patient suffering from pernicious anemia or pneumonia has better chances of recovery today than he had twenty-five years ago. In other words, the historical moment at which we live has a great influence on our physical life, and Paracelsus expresses this symbolically by speaking of the stars.

Man is a part of nature. He lives in a given physical environment from which he derives the matter and energy required to sustain his life. But from nature come also poisons and all the abnormal stimuli that cause disease. Everything that comes from nature, therefore, is both good and evil, is to man food, poison, and remedy. It is the dosage that determines its effect. This is the second sphere, which Paracelsus called *ens veneni*.

Although contemporaries in the *ens astrale*, no two individuals are exactly the same. We know that no two individuals have the same fingerprint, or the same handwriting. Each man is born with a nature of his own and thus carries to a large extent his destiny within himself. This is the third sphere, *ens naturale*.

Like animals man has body and mind. They are one and determine each other mutually. But then man is an animal of a special kind. He is conscious of himself and of his past. He not only feels pain but is able to reflect about the phenomenon of pain and to establish abstract concepts. That which gives man his special position in the world is the spirit. Man is a spiritual being and from this fact, from the fourth sphere, *ens spirituale*, may also result causes of disease.

These are the four spheres that determine man's life. This is the fourfold order under which he lives. When he is well adjusted to it, he is in

⁵ The finest interpretation of the *Volumen Paramirum* is that of J. D. Achelis, *Paracelsus Volumen Paramirum*, Jena, 1923.

great man. When the master died, he was universally praised and no superlative seemed strong enough to describe him. Charles Daremberg, in his *Histoire des Sciences Médicales*, felt rather helpless when he came to a discussion of Boerhaave.³ He found that the *Aphorisms* and the *Institutiones* possess neither profundity nor anything that surpasses ordinary human understanding, that they are neither novel in form nor sublime or unheard of in the doctrine they present. He stated that Boerhaave must have owned his fame for the simplicity of his life, his disinterestedness, his high qualities, strong sense of duty, enormous historical knowledge, and to the elegance and lucidity of his teaching. Dr. Schoute pointed out that this picture was completely erroneous and that Boerhaave's significance was to be sought first of all in the fact that he put medical education on an entirely new basis. A passionate teacher all his life, devoting every effort and every minute he could spare to his students, he laid the foundation for modern medical education.

It was then the turn of the foreign delegates. Professor Diepgen traced the very strong influence that Boerhaave exerted on German medicine. As late as 1770 Frederick the Great, commenting on a report of the Superintendent of the Prussian universities, wrote: "In medicine the professors must adhere first of all to the methods of Boerhaave," and a century after Boerhaave's death Ludwig I of Bavaria had his bust placed in the Valhalla near Regensburg as the bust of a "great German man."

Professor Comrie pictured the foundation of the medical school of the University of Edinburgh by a group of men who all had been students of Boerhaave. But he showed that the relations between Edinburgh and Leiden were not unilateral and that a Scotch physician, Pitcairne, was Professor at Leiden and had some influence on Boerhaave.

My turn had come. I conveyed the greetings of the American Association of the History of Medicine, which had commemorated Boerhaave at its annual meeting in Atlantic City on May 2, and I discussed Boerhaave's influence upon American medicine. The number of American students who studied at Leiden in Boerhaave's days was not large, and the chief influence was indirect, through Edinburgh. Most of the men who organized the medical department of the College of Philadelphia and constituted its first faculty were graduates of Edinburgh and had studied medicine under professors who were students of Boerhaave. It was chiefly in this way that the tradition of the school of Leiden was transplanted to America, and that Boerhaave's medical views dominated American medi-

³ *Histoire des Sciences Médicales*, vol. II, Paris, 1870, pp. 859-860.

one of his books had been printed so far, but rumor spread very rapidly in those days, and Paracelsus seems to have been known particularly for his successful treatments of surgical diseases and gout. It happened that the great printer Frobenius had been suffering for five years from the result of an accident. Gangrene had developed in his right foot, and the physician recommended an amputation. He decided to take a chance and to consult the new doctor. Paracelsus came, treated him, and saved his foot. At that time, the humanist Erasmus of Rotterdam was living in Frobenius' house. He was in poor health also, and he too was successfully treated by Paracelsus.

Upon the recommendation of these two influential men the Town Council offered Paracelsus the position of municipal physician that had just become vacant. This was the same kind of job that his father was holding in Villach. There was one difference, however; since Basle was a university city, the municipal doctor was at the same time professor in the medical faculty of the university.

Thus suddenly Paracelsus saw his most ambitious dreams fulfilled. His wanderings were coming to an end. He would be able to teach young students, to train them in the new "reformed" medicine that he had created. Being close to Frobenius, he would undoubtedly soon have an opportunity to see his books printed. He accepted eagerly and went to Basle in 1527. On June 5 of that year he announced his courses. He had the announcement printed, and not only posted it for the information of students in the customary way but sent it out to a number of colleagues. Indeed, it was not the usual announcement of traditional courses, but the program of a new medicine. It was, moreover, the first Paracelsian words that ever went to print. I cannot resist the temptation to quote a few abstracts from this program, as it beautifully reveals the Paracelsian attitude: The art of medicine, he said, had decayed. "But we shall free it from its worst errors. Not by following that which those of old taught, but by our own observation of nature, confirmed by extensive practice and long experience. Who does not know that most doctors today make terrible mistakes, greatly to the harm of their patients? Who does not know that this is because they cling too anxiously to the teachings of Hippocrates, Galen, Avicenna, and others?" What the doctor needed was a profound knowledge of nature and its secrets. "Day after day I publicly elucidate for two hours, with great industry and to the great advantage of my hearers, books on practical and theoretical medicine, internal medicine, and surgery, books written by myself. I did not, like other medical

him for the botanical garden from far remote regions, and he had a tremendous correspondence with many people who sought his medical advice, but it seems that the only journey he ever undertook was the trip to Harderwijk where he went for his medical degree. We first visited the St. Pieterskerk, a fourteenth century Gothic church in which Boerhaave is buried. His monument is an urn-shaped tombstone with figurines in relief representing the ages of man. The inscription reads "Salutifero Boerhaavii Genio Sacrum." Other famous Leiden scientists are buried in this church, such as Dodonaeus, Clusius, and Camper.

Our next visit was to the rooms in which Boerhaave gave his clinical teaching. They were two wards of six beds each, one for men, one for women, in the St. Caecilia Gasthuis. The building now contains workshops for unemployed, and Boerhaave's ward serves as dining room. Plans have been made for restoring the building and making it a museum. It was in this room that generations of physicians were trained in clinical medicine.

In buses we drove to Boerhaave's birthplace, the parson's house in Voorhout. Boerhaave was born here on December 31, 1668. His father was minister of the church in that village, an educated man who had "a good acquaintance with the Hebrew as well as Greek and Latin languages, but excelled in his knowledge of history; and was no less remarkable for frankness and candour in general, than for the prudence of his oeconomy, and a tender exemplary behaviour to his numerous offspring."⁴ And numerous it was. Boerhaave had six sisters, and after his mother's death, when he was five years old, his father married again and had six more children. It was in this house that Boerhaave received his first education. His father intended him for the ministry also, and with this view "he himself initiated him in grammar, according to the method of Vossius, and proceeded with him from the *Colloquies* of Erasmus to Terence, the Greek testament, and universal history, particularly *Christiani Matthiae Theatrum*; and with such success, that at eleven our youth was well versed in these, expert in the rules of the Latin and Greek grammar, ready at translating and writing Latin, and not ignorant of etymological learning."⁵ His hours of leisure were devoted to horticulture, and it was in his father's garden that he first became a lover of the *scientia amabilis*, botany. A long illness interrupted his studies. It was in his own

⁴ "Commentariolus De Familia. Studiis, Vitae Cursu, etc. Propria Boerhaavii Manu Conscriptus. Et post Obitum inter Eiusdem MSS. Repertus," in W. Burton, *op. cit.*, p. 203, 3.

⁵ *Ibid.*, p. 204, 4.

him and the use of the lecture hall was granted. The hostility of the faculty he could bear. This was to be expected. A reformer is prepared for struggle and does not expect sympathy and cooperation from the people whose doctrines he is reforming. His hope was in the students, in the young medical generation. They represented the medicine of the future; they would understand his message and would carry his teachings all over the world. But here Paracelsus met with the most bitter disappointment. The students did not understand him either. They sided with the faculty against him. They also wanted to be respectable physicians some day. One morning a lampoon ridiculing him was found on the doors of some of the churches and on the new student bourse. From the content it became obvious that it could have been written only by one of his own students. Paracelsus was deeply hurt; he asked the Town Council to protect him and to punish the culprits. It was a sad sight—a reformer burning with zeal to carry his students along with him yet forced to ask the authorities to protect him against these very students.

Paracelsus felt deeply discouraged. Frobenius, who had always protected him, had died, and outside the Town Council he had no friends. A scandal soon brought the situation to a climax. Paracelsus had treated and cured a canon of the cathedral. He was a rich man and was charged a rather high fee. Paracelsus, who had never owned anything and whose patients were mostly paupers, followed the custom of the day and charged rich people fees. The canon refused to pay, brought the matter to court, and won his case. This was the end. The battle was lost. Paracelsus had no friend left in the city of Basle, no audience that would listen to him. Without taking leave from anybody, he left the city in February, 1528, and began his wanderings once more, a lonely and defeated man but convinced more than ever of the significance of his mission.

He went where he had come from, into Alsace, to Colmar. In Basle he had worked feverishly in the preparation of his courses and had accumulated endless notes; some of them were worked out into books, but first of all he felt the need of justifying his teachings before himself and the world. He did it in the book *Paragranum*. I do not know what the title means. Paracelsus liked mysterious names beginning with para, such as Para-granum, Para-mirum, Para-celsus. The book deals with the four pillars of medicine. It is written in aggressive, passionate language. "I treat of the principle from which I write, that principle without which no doctor can advance. Therein I have laid myself so bare that my heart shall at last be revealed for what it is." "You must follow me and not I

of botany. B. W. Th. Nuyens is still very active and enterprising, and the Dutch Society of the History of Medicine, Science, and Mathematics has a wide appeal in the country, meets regularly, and publishes its transactions with the *Nederlandsch Tijdschrift voor Geneeskunde*. The history of science has another center of research in Holland in the Nederlandsch Historisch Natuurwetenschappelijk Museum, in Leiden, an outstanding museum of the history of science with a staff of researchers who are approaching the subject from a broad philosophical angle. Dr. C. A. Crommelin is Director of the museum, Prof. C. J. v. d. Klaauw, Adjunct Director, and Dr. M. Rooseboom, Research Assistant.

The following day, September 24, we met in Utrecht, from where we drove to Harderwijk, a small town of about 9000 inhabitants in the province of Guelderland, located on what used to be the Zuider Zee and now Yssel Lake. Here on July 13, 1693, Boerhaave obtained his degree of doctor of medicine. The origins of the Academy of Harderwijk can be traced far back to the fourteenth century. In 1372 a grammar school was established in the monastery of the Franciscan friars. It must have been very popular during the Renaissance, because in 1503, when a great fire destroyed the city and also the school, not fewer than 350 pupils lost their lives. The school survived the catastrophe, however, and remained the center of higher education in the province until it was replaced by the Provincial Guelder Academy in 1648, which lived with ups and downs until it was closed in 1811.

We assembled in the town hall and were welcomed by the mayor, a jovial gentleman who gave us some information about the history of the city and, later, showed us the very interesting municipal museum. A local physician, Dr. C. P. J. Penning, then read a paper commemorating Boerhaave at Harderwijk. On July 12, 1693, Boerhaave arrived in the city, twenty-four years old, a Doctor of Philosophy of the University of Leiden and a Bachelor of Medicine. He carried with him his thesis *De Utilitate Explorandorum in Aegris Excrementorum ut Signorum*, which he defended the following day before the assembled faculty and student body of the academy. He was examined about a case of apoplexy, about some aphorisms of Hippocrates, and about the thesis itself. His answers must have been satisfactory because the *Album Studiosorum Academiae Gelro-Zutphanicae*, in which his examination was entered, bears the mention "Omnia exacte et solide." Dr. Penning speculated as to how Boerhaave spent the night of his graduation day, whether in learned conversations with his professors or in drinking and feasting with his fellow students.

of Pfäfers, waters that were famous in the treatment of syphilis. The Nürnberg publisher was willing to issue other works of Paracelsus, but the medical faculty of the University of Leipzig protested and discouraged him from proceeding with the plan. Only one of his major works, the *Grosse Wundartzney*, was published in his lifetime. It was a great success and was printed several times, in Ulm in 1536 and in Augsburg the same year. All his other great books, however, *Paragranum*, *Paramirum*, the books on tartaric diseases, and the pharmacological writings never found a publisher during his lifetime. They became known to the world much later, when some of his followers, primarily Adam von Bodenstein and Johannes Huser, collected whatever manuscripts they could find and published them. Huser's edition of the collected works, published in Basle from 1589-1591, is still one of the most useful editions, with which we must work as long as the Sudhoff edition has no indices.

We know very little about the period from 1528 to 1541, the thirteen last years of Paracelsus' life. He was in St. Gall in 1531 where he met the great humanist Vadianus. It may be that once more he played with the idea of settling down, but nothing came out of it. St. Gall was upset by religious struggles and Paracelsus did not stay long in the city.

During those years Paracelsus went through a deep religious crisis. He was too much of a mystic to follow the Reformation, but too much of a nonconformist to accept the integral doctrine of the Catholic Church. For a number of years we have no records of his life. All we know is that he was in the mountain region of the eastern part of Switzerland, and that during those years he wrote most of his theological writings, examining and discussing in his own way the basic principles of the Catholic Church.

For a while it looked as if he had given up medicine entirely, but when an epidemic of plague broke out in the Inn valley the physician in him was challenged. He came back to earth, took up the fight again, wrote a plague book for the city of Sterzing, and once more he took the pen to justify himself and his teachings before the world. He did it in seven splendid *Defensiones*, his most personal work, which reveals his personality better than anything he had written before.* He continued his itinerant life, practicing and writing until he returned to Salzburg. There he died and was buried in the church of St. Sebastian.

What is the significance of Paracelsus in the light of four hundred years? When we compare him to other great physicians and surgeons of

* An English translation of the *Defensiones* by Mrs. C. Lillian Temkin is in press (1941).

recorded on the same monument. Dr. C. Fehmers, President of the Dutch Medical Association, dedicated the tablet.

A luncheon was then offered to us, a real *Geldersche koffietafel*, in a garden restaurant on the shore of the Yssel Lake, and after that we sailed by boat from Harderwijk to Amsterdam. It was a delightful trip of several hours, and just at sunset we reached the city. This concluded our pilgrimage—and two enchanting days.

AMBROISE PARÉ'S ONION TREATMENT OF BURNS

AMBROISE PARÉ (1510-1590) was a keen observer. As a surgeon who had not studied in a university, he did not share the academic bias of many contemporary physicians and relied on his own observations rather than on reasoning along traditional lines. Like Paracelsus he was always on the alert, eager to learn from any, even the humblest, source.

When a man like Paré tells us that he saw a phenomenon with his own eyes, or that he repeatedly experienced good results with a given treatment, we must listen to him. He may be wrong, but there are good chances that his observations were correct, particularly when they took place in the field in which he was a master, the field of surgery.

With the increasing use of firearms, burns occurred frequently in the days of Paré and surgeons were obviously anxious to improve their treatments. The traditional therapy consisted in the application of cooling ointments, but some surgeons had more specific remedies. Thus a colleague of Paré once told him that he was using ink in the treatment of burns with excellent results. "He was keeping this ink as a great secret."¹ Ink that contains a great deal of tannic acid had already been recommended by Galen.²

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¹ *La Méthode de Traicter les Playes Faictes par Hacquebutes*, Paris, 1545, fol. 55.

² Ed. Kuhn, XII, 226.

behind the Vrouwen-Kerk, felt the magnetism of his personality and developed a fanatic devotion to him. We can catch the atmosphere that surrounded Boerhaave in the student diary of Haller, in his commentary to the *Institutiones*, and in van Swieten's commentary to the *Aphorisms*. Written from lecture notes, both these commentaries frequently illustrate the master in his own words and supplement what the conciseness of the original text concealed. Boerhaave knew how to inspire young people. He gave them no dogmas but a scientific method of approach to medical problems. And when the students left Leiden they spread all over the western world and passed the master's teaching on to their own students.

Every period has a definite medical ideal, and history has stamped those men as great doctors who came nearest to the medical ideal of their time. Boerhaave is one of them.

Boerhaave's influence on the Viennese school, on Göttingen and Edinburgh, is well known. But this influence reached further, to Turkey in the East and in the West to the new world—to America.

There was no medical school in the English colonies of North America until the medical department of the College of Philadelphia was organized in 1765. There were few doctors in the colonies, and a young man who desired to become a physician had the choice either to learn the art of medicine by serving a practitioner as an apprentice for a number of years—usually six—or then to go abroad for study at some European university. Traveling, however, was expensive, the colonies were not rich, and few people could afford to spend years of study abroad.

It has been estimated that even at the time of the Revolution the colonies had not more than 3500 physicians, of whom only 400 had a medical degree. The others had all been trained through apprenticeship, a system which, primitive as it may seem, had definite advantages. It provided thorough practical instruction at the bedside of patients at a time when many European universities were still emphasizing the theory of medicine. And in addition it trained the student in both medicine and surgery, while in most European countries there still existed a definite antagonism between the two fields. Not a few students, after four years of liberal education in college and six years of medical apprenticeship, completed their course of study by traveling in Europe for one or more years, a trip that was the more profitable as the student already had a good deal of practical experience. The medical schools organized in America in the eighteenth century (after Philadelphia: the medical department of King's College in New York, 1768; Harvard, 1783; Dartmouth, 1793) were not

burns.⁷ He said repeatedly that, if a cataplasm of onions could be applied to a burn immediately, it would prevent the development of blisters and ulcers and thus lead to a much more rapid recovery.

But now Paré felt that he should explain the action of onions on burns, and this was not quite easy. According to Galen, onions were hot in the fourth degree and the pharmacological principle usually applied at that time was *contraria contrariis curantur*. Fortunately it was with Galen as it is with the Bible. If you searched long enough you could always find a passage that would lend authority to your thesis. Paré was convinced of the effectiveness of his treatment, and the purpose of the theoretical explanation was merely to confirm his experience. He reasoned in the following way:⁸

If any endeavour to gainsay the use of this remedy by that principle in Physicke, which says, that contraries are cured by contraries, and therefore affirme that Onions according to the authority of *Galen*, being hot in the fourth degree, are not good for combustions; let him know that Onions are indeed potentially hot, and actually moyst, therefore they rarifie by their hot quality, and soften the skinne by their actuall moysture, whereby it comes to passe that they attract, draw forth, and dissipate the imprinted heate, and so hinder the breaking forth of pustles; To conclude, the fire as we formerly noted, is a remedy against the fire. But neither are diseases alwayes healed by their contraries (saith *Galen*) but sometimes by their like; although all healing proceede from the contrary, this word *contrary*, being more largely and strictly taken; for so also a Phlegmon is often cured by resolving medicines, which health it by dissipating the matter thereof. Therefore Onions are very profitable for the burnt parts, which are not yet exulcerated or excoriated.

This theoretical explanation is not important. What counts is that Paré found a treatment of burns which the experience of a lifetime told him was effective.

Paré's works, written in French, translated into Latin, English, German, Dutch, Italian, and Japanese, were widely read and exerted a great influence upon surgery. It is, therefore, no wonder that other surgeons in the sixteenth and seventeenth centuries applied Paré's onion treatment of burns. A few examples will suffice to demonstrate this.

William Clowes (ca. 1540-1601), one of the best Elizabethan surgeons, published in 1591 *A prooved practise for all young Chirurgians, concerning burnings with Gunpowder, and woundes made with Gunshot, Sword, Halbard, Pike, Launce, or such other*. The book begins with the gruesome story of two gentlemen who were drying gunpowder in a brass pan,

⁷ *La Méthode de Traicter les Playes Faictes par Hacquebutes*, Paris, 1545, fol. 52.

⁸ Johnson, *op. cit.*, p. 450; Maligne, *op. cit.*, p. 204.

influence in their country. Nicholson, as we saw before, remained in Europe. Bull abandoned medicine. Dubois died very young, and only Johnston and van Beuren practiced for a longer period of years. Boerhaave's influence upon American medicine, as a matter of fact, was largely indirect, and the chief centers of influence were the University of Edinburgh and the College of Philadelphia.

The medical faculty of the University of Edinburgh³ can truly be called a daughter of Leiden. Most of the first professors appointed were students of Boerhaave: James Crawford (physic and chemistry), Alexander Monro (anatomy and surgery), Andrew Plummer (chemistry and medicine), Charles Alston (botany). The official textbooks used in the courses were Boerhaave's books. Andrew St. Clair taught institutes by discussing the *Institutiones Medicae*; John Rutherford used the *Aphorismi de Cognoscendis et Curandis Morbis* in teaching the practice of medicine. The *Elementa Chemiae* served as a textbook in chemistry courses. The method and spirit of Boerhaave permeated the school and were kept alive long after the master's death.

We mentioned before that, toward the middle of the eighteenth century, American students came to Edinburgh to study medicine in ever-increasing numbers. In Edinburgh they were taught the principles of Boerhaave's medicine. They went home to America with Boerhaave's books, applied his principles in their practice, and passed them on to their apprentices. No wonder that Boerhaave's medical system dominated in American medicine for decades.

Dr. Benjamin Rush of Philadelphia, whom we shall discuss presently, wrote in the matter:⁴

The system of Dr. Boerhaave then (1760) governed the practice of every physician in Philadelphia. Of course diseases were ascribed to morbid acrimonies, and other matters in the blood, and the practice of those years was influenced by a belief in them. Medicines were prescribed to thin, and to incassate the blood, and diet drinks were administered in large quantities, in order to alter its qualities. Great reliance was placed upon the powers of nature, and critical days were expected with solicitude, in order to observe the discharge of the morbid cause of fevers from the system. This matter was looked for chiefly in the urine, and glasses to retain it were a necessary part of the furniture of every sickroom. To ensure the discharge of the supposed morbid matter of fevers through the pores, patients were confined to their beds, and fresh and even cool air, often excluded by closed doors and curtains. The medicines to

³ John D. Comrie, *History of Scottish Medicine*, London, 1932, vol. 1, p. 289 ff.

⁴ Benjamin Rush, "An Inquiry into the Comparative State of Medicine, in Philadelphia, between the years 1760 and 1766 and the year 1809," in B. Rush, *Medical Inquiries and Observations*, ed. 3, Philadelphia, 1809, vol. IV, pp. 395-396.

until the Heat and Pain cease, or the fire be taken out, (as the common expression is;) else they will rather cause Pain. Hot Medicaments assuage the fiery Heat and Pain by Rarefaction. Which in the first place may be done by the holding a burning hot Iron or Fire to the Part: So whilst the Fire calls forth that Fire it made, it becomes its Alexiterium. But the common remedy is, to apply Salt and an Onion beaten together. But this is not to be done after the Blisters are risen, nor by any means where the Part is raw; for so you will exasperate the Pain, and increase the Inflammation.

The greatest German surgeon of the period, Fabricius Hildanus (1560-1634) was a strong advocate of the onion treatment of burns.¹¹ He used it invariably for burns in the first degree in order to prevent the formation of blisters. He gives several interesting case histories, one of which concerned his own wife who once burned her right hand in boiling soap. He always had good results with the treatment. His recipe was:

Raw onions, 1½ ounces

Salt

Venetian soap, 1 ounce each.

Mix in a mortar and make an ointment with rose-oil and oil of sweet almonds.

Fabricius warned that the ointment should not be used on the face since it affected the eyes.

I have no doubt that one could find many more passages on the subject in the surgical literature of the period, but they would probably be a mere repetition.

The onion treatment of burns was gradually given up when the pharmacological theories of Galen were abandoned. Surgery, like medicine, become more scientific, and remedies the effect of which could not be easily explained in current scientific terms were dropped. This happened more than once.

§

In 1923 I published a new edition and a German translation of Ambroise Paré's treatise on gunshot wounds.¹² When you translate such a book you come to know its author very intimately, and the more I knew of Paré the more I admired him. I was greatly attracted by his frank, unbiased, experimental approach, by his honesty, and by his modesty. In the intro-

¹¹ Des Guillelmi Fabricii Hildani Wund Artney, Franckfurth am Mayn, 1652, pp. 472, 1190-1192.

¹² Ambroise Paré, *Die Behandlung der Schusswunden* (1545), *Klassiker der Medizin*, Leipzig, 1923.

Morgan succeeded with his plans without difficulties, because the idea was in the air. The need for a medical school was generally felt in America, and Philadelphia was an excellent place for such a foundation. It had a flourishing college that was soon to become the University of Pennsylvania, and it had a very good hospital, the Pennsylvania Hospital, that had been founded in 1751.

The new medical school had an excellent faculty consisting largely of graduates of Edinburgh. Morgan himself was appointed Professor of the Theory and Practice of Medicine. William Shippen, another Edinburgh graduate, was made Professor of Anatomy and Surgery (1761). Thomas Bond gave clinical lectures at the hospital. He was a brother of Phineas Bond, who had graduated at Leiden, and was himself a great admirer of Boerhaave, whom he quoted in a clinical lecture held in 1766:⁷

The great Boerhaave was not only present at human post-mortems, but attended Leiden Slaughter Houses. When asked, how he knew so much about diagnosis and prognosis of disease he replied: (1) examining dead bodies, (2) studying Sydenham's *Observationes* and Bonetus' *Sepulchretum Anatomicum*, both of which he had read 10 times.

In 1768 Adam Kuhn, a brilliant student of Linnaeus, and also a graduate of Edinburgh (1767), was appointed Professor of Materia Medica, and in 1769 Benjamin Rush joined the faculty as Professor of Chemistry. Like Morgan he had studied with John Redman for six years and had graduated at Edinburgh (1768). After Morgan's death in 1789, he succeeded him as Professor of the Theory and Practice of Medicine.

It was the youthful faculty of a young school. If the faculty of Edinburgh could be called a daughter of Leiden, then the faculty of Philadelphia can with equal right be called a daughter of Edinburgh and therefore, a granddaughter of Leiden. No wonder that the spirit of the new clinical medicine was fully alive and that Boerhaave's influence was strongly felt.

It was felt also outside of Philadelphia. Edinburgh graduates had influential positions in other cities. Samuel Bard, a graduate of 1765, was the first Professor of the Theory and Practice of Medicine in the medical school of King's College in New York, which had been organized in 1768. It was discontinued during the revolutionary war, was revived, was amalgamated with the College of Physicians and Surgeons and ultimately became part of Columbia University.

⁷ Published by Francis R. Packard, *History of Medicine in the United States*, New York, 1931, vol. II, p. 1201.

And so, after twenty years, today again I would like to draw the attention of my colleagues to Ambroise Paré's onion treatment of burns. It may be that he was wrong but it may well be that he was right, and it would not be the first time that empiricism had preceded science in the history of medicine.

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Harvey's precursors, tried to diminish his contribution, to deny him any originality, even to accuse him of plagiarism. As if every discovery did not have its precursors! As if every discovery was not hovering in the air, anticipated and half-recognized by many, and yet fully realized and formulated for the ages only by one man.

It is not my task here to add my voice to the many who this year are praising Harvey. That is not necessary. Instead I will try to evaluate Harvey's position in the history of European thought and to clarify his contribution in the light of his period's concept of the world.

Speculations about the nature and significance of blood can be found early and are probably much older than we can prove. Even to primitive man certain substances must have seemed vital: nourishment, which he gained through hard labor, air, which he inhaled and exhaled as long as life existed, but also blood, which escaped from wounds and which was found everywhere in the body.

Long ago, also, the heart must have aroused particular attention as the organ which was located in the middle of an organism and was in constant motion, a motion which, either softly or wildly beating, accompanied all emotions and stopped only with death. The Paleolithic fresco of an elephant with a mysterious heart in his interior proves that primitive man was concerned with the heart.

All physiological speculations originated from these vital substances and attempted to find relationships between the substances of the external world, nutrition and air, and blood, that vital substance of the inner world.

We find the beginning of such a theory in the ancient Egyptian doctrine of the vascular system and more concretely with the Greeks. For Aristotle the heart is to the body what the sun is to the cosmos. The heart is the source of bodily heat, the origin of the vessels, and the seat of the reason. It is the *punctum saliens*, the most vital point, which develops first in any organism.

In late antiquity we finally find Galen's well-developed theory, which remained in effect for 1500 years until Harvey disproved it. This theory is not to be found in any one of Galen's writings; in antiquity physiology did not exist as a special and separate science. We have to search for his theory in his various writings, and we are not the first to undertake this search, for we follow in the steps of the physicians of the Middle Ages and the Renaissance. This theory is as follows: the digested food moves from the colon through the veins into the liver and there is transformed into

AN ELIZABETHAN POET'S
CONTRIBUTION
TO PUBLIC HEALTH:
SIR JOHN HARINGTON AND
THE WATER CLOSET

MEDICAL history remembers Sir John Harington (1561-1612) for two contributions, his English translation of the *Regimen Sanitatis Salernitanum* and—more important—his invention of the water closet.

Harington's life has been presented very delightfully by George Adami in a paper that was read before the Johns Hopkins Hospital Historical Club in 1908.¹ We shall not repeat the biography but merely remind the reader that Sir John Harington was a man of the world, godson of Queen Elizabeth, courtier and poet who translated Ariosto's *Orlando Furioso*. Educated at Eton and Cambridge, he studied law at Lincoln's Inn, wrote epigrams, accompanied the Earl of Essex on his expedition to Ireland, lived at the court when he was in favor, on his estate at Kelston when he was in disgrace. More than once he infuriated the Queen with his pranks, but he always succeeded in being pardoned.

Harington's *The Englishmans Doctor. Or, The Schoole of Salerne. Or, Physicall observations for the perfect Preserving of the body of Man in continuall health*, published in 1607² and several times thereafter, was

¹ It was published first in the *Bulletin of the Johns Hopkins Hospital* 19:285-295, 1908. See also Bishop Mandell Creighton's article in *Dictionary of National Biography*, 1903, vol. VIII, pp. 1269-1272; Lytton Strachey's essay in *Portraits in Miniature*, London, 1931, pp. 1-9; Townsend Rich, *Harington and Ariosto*, New Haven, 1940.

² Reprinted New York, 1920, Paul B. Hoeber, with Latin text and introductory essays by Francis R. Packard and Fiedling H. Garrison.

vestigating the basic structure of the human body, a task which became the program for the entire century. Speculative anatomy, which did not query the form but rather the meaning of the organs, and which had played a very significant role in antiquity and the Middle Ages, now gave way to descriptive anatomy, the task of which was to describe factually the shape, construction, and position of the organs. Such studies turned the thought of the times to more factual, tangible objects.

In Padua, the working place of Vesalius, a school of anatomy was founded which for generations was directed by important minds. But also in Bologna, Rome, and Naples men worked feverishly on the solution to the great problem. Toward the end of the century the igniting spark crossed the Alps, inspiring minds.

During these anatomical studies the structure of the heart and the organs became better known, and, because gradually a beginning was made at organic and mechanistic thinking, doubts arose about the correctness of Galen's theory. According to Galen the blood should flow from the right chamber through the pores of the septum into the left chamber. But these pores could not be found. They did not exist. In antiquity, also, nobody had seen them. But that did not prevent their supposed existence, because they had to be there, because the system demanded it. Now, however, such suppositions began to be opposed, although only very timidly.

The sixteenth century relinquished the problem of the movement of the blood. This resignation was expressed by Fracastoro, one of the most brilliant men of the century, when he said that the movements of the heart were known to God alone. The problem was simply not topical. The thought of the whole century had been static. The structure of the body had been studied, and, as in the case of the Greeks, philosophical speculations had been undertaken concerning its function.

In the seventeenth century this conception changed radically, and so we come to William Harvey.

Harvey was born in 1578 in Folkestone. Biographically significant is the fact that at nineteen he moved to Padua and worked there for three years as a pupil of the anatomist Fabrizio d'Aquapendente. He had entered the circle of anatomists in which the tradition of Vesalius was being kept alive. Returning to his native land, he devoted himself to the practice of medicine, and in 1615 was made professor of anatomy at the College of Physicians in London. A lecture manuscript of this year shows that already in 1615 he had a pretty clear picture of the circulation of

haue so easie, so cheape, & so infallible a way for auoyding such annoyances in great houses: you may not onely pleasure many great persons, but doe her Maiesty good seruice in her Pallace of Greenwich and other stately houses, that are oft annoyed with such sauoures, as where many mouthes bee fed can hardly be auoided. Also you might bee a great benefactor to the Citie of London, and all other populous townes, who stand in great neede of such conuayances. But all my feare is that your pen hauing beene inured to so high discourse.

"Of Dames, of Knights, of armes, of loues delight."

will nowe disdaine to take so base a subject,

Of vaults, of sinkes, priuies & draughts to write.

But herein let a publick benefit expell a priuate bashfulnesse, & if you must now and then breake the rules *de slouililate morum*, with some of these homely words, you see I haue broken the ice to you, and you know the old saying, pens may blot, but they cannot blush. And as olde Tarlton was wont to saie, this same excellent worde sauereuerence, makes it all manerlie. Once thys I dare assure you, if you can but tell a homely tale of this in prose as cleanly, as you haue tolde in verse a bawdie tale or two in Orlando manerlie, it maye passe among the sowrest censurers verie currantly. And thus expecting your answer here to, at your conuenient leysure, I commit you to God this of 1596.⁶

Misacmos (Harington) could not resist the invitation:

Now Syr, to come to the chiefe point of your desire, which requires a more ample answer, but for a preamble you must be content with this. You tell me, belike to encourage me, that my inuention may be beneficiall, not only to my priuate friend, but to Townes and Cities, yea euen to her Maiesties seruice for some of her houses: trust mee I doe beleue you write seriously as you tearme it heerein, and for my parte I am so wholly addicted, to her highnesse seruice, as I would be glad, yea euen proud, if the highest straine of my witte, could but reach to any note of true harmony in the full consort of her Maiesties seruice, though it were in the basest key that it could be tuned to. And if I should fortune to effect so good a reformation, in the Pallace of Richmond, or Greenwich (to which Pallace, many of vs owe seruice for the tenure of our lande) I doubt not but some pleasant witted Courtier of either sex, would grace me so much at least: as to say that I were worthy for my rare inuention, to be made one of the Priuie, (and after a good long parenthesis,) come out with chamber, or of they bee learned and haue reade *Castalios Courtier* they will say, I am a proper scholer, and well scene in *latrina lingua*. But let him mocke that list, *qui moccet moccabitur*.⁷

The "stale subiect" is discussed in endless variations with a great display of classical learning, and finally in the third section Harington comes to the description of his invention:

⁶ *Ibid.*, pp. 1-3.

⁷ *Ibid.*, pp. 6-7.

A BOERHAAVE PILGRIMAGE IN HOLLAND



ON September 8, 1738, Herman Boerhaave wrote to Dr. Mortimer, Secretary of the Royal Society, the following letter:¹

It is a year since age, application, and immoderate fatness have produced an utter ineptitude to any kind of exercise in such a heavy corpulent body, full of inert humours, and upon the least motion gasping for breath, with a pulse strangely irregular; but the most urgent symptom was the interruption, or stoppage of respiration on falling asleep, and the prevention of any rest by a sudden terrible sensation as of strangling. Upon which the abdomen and all the parts below it became dropsical; but notwithstanding the removal of these symptoms, there remain pain of the belly with great weakness and anxiety, a suffocating asthma; short are my slumbers, disturbed with dreams, the mind is incapable of any business; wearied with this conflict I gain no release, yet patiently wait the divine pleasure to which I am wholly resigned.

Two weeks later on September 23 between four and five o'clock in the morning he passed away. He was in his sixty-ninth year and would have reached the age of seventy three months later. When he died, Holland lost its greatest physician and the whole of Europe its clinical teacher.

It was obvious that the two-hundredth anniversary of the death of

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Read before the Johns Hopkins Medical History Club on November 14, 1938.

¹ "Ex Epistolis Nondum Editis Analecta," in W. Burton, *An Account of the Life and Writings of Herman Boerhaave*, ed. 2, London, 1746, pp. 215-216, 69-70.

two beside mine own to speake off, because men of good iudgment haue allowed them for good, but yet (as the ape dooth his young ones) I thinke mine the properest of them all.

The first and the ancientest, is to make a close vault in the ground, widest in the bottome, and narrower vpward, and to floore the same with hot lyme and tarris, or some such drie pauing as may keepe out all water and ayre also: for if it be so close as oo ayre cao come io, it doth as it were smother the sauour, like to the snuffes or extinguishers wherewith wee put out a candle, and this standes with good reason, that seeing it is his nature to make the worse sauor the more he is stirred, and nothiog makes him keepe a more stinking stirre, then a little wiode and water, surely there can be little or oo annooyance of him in this kiode of house, where he shall lye so quietly. But against this is to bee objected, that if there be a little cran- nie in the wall as big as a strawe, or if the grounde stoad vpon wioter springes or bee subiect as most places vnder ground are, to giue with moist weather, then at suche times it must oeds offeod.

Besides in the Princes houses where so many mouths be fed, a close vault will fil quickly: and that objection did my Lorde of Leicester make to Sir Iohn Young, at his last being at Bristowe, who commended to my Lord that fashion, and shewed him his owne of a worse fashion, and told him that at a friends house of his at Peter hill in London, there was a very sweet priuy of that making.

Another way, is either vpon close or open vaultes, so to place the seiges or seates as behinde them may rise tuns of chimneys, to draw all the ill aires vpwards: of which kind I may be bold to say, that our house of Lincolnes Inne, putteth downe al that haue been made afore it, and is indeed both in reason and experience, a meanes to auoid much of the annoiance that is wont to come of them, and keepeth the place all about much the sweeter. But yet to speake truly, this is not safe from all infection or annoyance wbyle one is there, as my sence hath tolde me, for

"Sensus non fallitur in proprio obiecto."

Or perhaps by the stricte wordes of the statute it ought to bee so, and that but two parties may bee deuysed away, and a thirde muste remaine to the beire, for I dare voderiake, goe thither when you will, your next heyre at the common house, whatso- euer charge hee is at in the sute, I am sure he may be made a sauor, at least for the *tertiam partem* aboue all reprises, if the fault be not his owne. And further whco the wether is not calme, the winde is so vnruely, that it will force the il ayres down the chimneis, and not draw them vp. as we see it dooth in chimneyes where fire is made, force downe the smoke, ootwithstanding that the very nature of fire helpeth to enforce it vpwarde, where as these moyst vapours are apt (euen of their owne nature) to spreade abroade, & haog like a deaw about euery thing. Wherefore though I am but a punie of Lincolnes ynoe and the builder heereof was a benchor, yet I will vnder reformation, preferre my deuise afore his, eyther because it is better: or else out of the common faulte of young men in this age, that wee thinke our deuises wiser then our elders. Yet with this respectiue modestye, that because my deuise is with water, where that cannot bee had, or where houses stand on an exceeding flat, there I will leaue the worke to his oversight, but where any couenient current is, and no want of water, there I woulde be surueyer, and so to deuide the regiment,

end of the eighteenth century anatomy again gained the upper hand, only to be superseded in our day by functional thinking.

The history of the circulation of the blood, like the history of science in general, and the history of medicine in particular, demonstrates the close alliance with the history of culture. The history of a medical problem can never be considered as an isolated factor but only in closest connection with other sciences, only on the territory of a *universitas litterarum*.

the sluice or washer of brasse with soder or Ciment, the Concautie or hollow thereof, must be ij. inches and $\frac{1}{2}$.

To the washers stopple, must be a stemme of yron as bigge as a curten rod, strong and euen and perpeodicular; with a strong skrew at the top of it, to which you must haue a hollow key with a woorme fit to that skrew.

This skrew must, when the sluice is downe, appeare through the planke not aboue a straw-breadth on the right hand, and being duly placed, it will stand three or foure inches wyde of the midst of the backe of your seate.

Item, that children & busie folke, disorder it not, or open the sluice, with putting in their hands, without a key, you should haue a little button, or scallop sbell, to bind it down with a vice pinne, so as without the key it will not be opened.

These things thus placed: all about your vessell and elsewhere, must be passing close plastered with good lyme and hayre, that no ayre come vp from the vault, but onely at your sluice, which stands close stopt, and euer it must be left, after it is voyded, halfe a foote deepe in cleane water.

If water be plentie, the oftener it is vsed and opened, the sweeter; but if it be scant, once a day is inough, for a neede, though twentie persons should vse it.

If the water will not run to your Cesterne, you may with a force of twentie shillings, and a pype of eighteen pence the yard, force it from the lowest part of your house to the highest.

But now on the other side behold the Anatomie.

"A Plaine Plot of a Priuie in Perfection" follows, two drawings with descriptions and an account of costs which shows that this perfect device could be constructed for the trifling sum of one pound, ten shillings, and eight pence. In another section of the book there is a picture showing the privy in use.

§

The publication of the *Metamorphosis of Ajax* got its author into trouble once more, not because of its subject—our Renaissance ancestors were not prudish in physiological matters—but because of a suspected reference to Leicester. There was even some talk of the Star Chamber, but the whole affair was less serious than it seemed. The Queen finally laughed and even had a privy à la Harington built in Richmond Palace—with a copy of the book hanging from the wall, whereupon the poet could not resist the temptation of writing an epigram:⁹

*To the ladies of the Queenes Priuy-Chamber, at the making of their
perfumed priuy at Richmond.*

The Booke hangd in chaines saith thus:

⁹ *The Letters and Epigrams of Sir John Harington . . .*, edited by Norman Egbert McClure, Philadelphia, 1930, p. 163.

Boerhaave would not pass unnoticed, and indeed the Senate of the University of Leiden, the Dutch Medical Association (*Nederlandsche Maatschappij tot Bevordering der Geneeskunst*), the Dutch Medical Journal (*Tijdschrift voor Geneeskunde*), and the Dutch Society of the History of Medicine, Science, and Mathematics invited the Dutch physicians to a formal exercise in the University of Leiden and to an excursion to all the places where Boerhaave had lived. They invited, in addition, representatives of the four countries upon which Boerhaave had exerted his greatest influence: Germany (Professor Paul Diepgen), Austria (Professor Karel Frederik Wenckebach), Scotland (Professor John D. Comrie), and the United States (Henry E. Sigerist).

These two days will remain unforgettable to all who had the privilege of attending the celebration. Europe was in a turmoil with every country mobilizing troops, but Holland seemed an island of peace. The organization of the meeting was perfect in every respect, and the committee seemed to control even the weather, which can be very nasty at this time of year. It was warm still, and in the morning a silvery mist was seen hanging over the flat land and the canals until the sun appeared and tinted the country with tender colors. The last flowers were fading in the fields.

On the morning of September 23 we came together in Leiden, Boerhaave's city, where every corner, every stone, carries his memory. The formal exercises were held in the Great Hall of the university hospital, which is the core of the Boerhaave-Kwartier, the new medical center, a campus that includes all departments of the medical school. The members of the Leiden faculty in academic gowns sat to the right. The foreign delegates and guests were seated in the front row, and several hundred Dutch physicians and their ladies had come to the meeting, which was opened by the Rector of the university, Professor P. C. Flu, who in warm words welcomed the guests and stressed the significance of the day. He was followed by the Minister of Education, His Excellency Slotemaker de Bruine, who is a great orator and knows it.

Dr. D. Schoute then delivered the principal address commemorating Boerhaave and his work.² The tenor of his talk was a polemic against Daremberg and a discussion of the facts that had made Boerhaave a truly

² All addresses were published in the *Nederlandsch Tijdschrift voor Geneeskunde* 82:4779-4912, 1938. A mimeographed English translation of Dr. Schoute's address was presented to the English-speaking delegates, and copies were sent to the chief medical libraries of the United States.

receptive to Harington's idea. His privy was an improvement, to be sure, but was cumbersome enough. The tank had to be filled. The fecal matter was flushed but into a vault, into the jakes which had to be emptied by scavengers. The water closet could not come into more general use before houses were supplied with running water and connected with sewers. Harington's purpose was not the sanitation of England but was to keep a certain room "sweet and savory." In this he succeeded well enough, but centuries had to elapse before medicine could demonstrate the necessity of plenty of fresh water and of a quick removal of sewage.

The water closet was an English invention, and from England it conquered the world, or at least a small, a very small, section of it. Its English origin is still reflected in various languages. In Germany it became the *Wasserklosett*, or colloquially abbreviated the *Klo*. France no longer speaks of *lieux à l'anglaise* but simply uses the English term, water closet, which is usually shortened and is pronounced somewhat like *le vatere*. It is most appropriate that our children colloquially call this convenience "the john" since it was a John who gave it to us in its improved form—Sir John Harington.

cine until they were superseded in the last quarter of the eighteenth century by the theories of Cullen and Brown, which enjoyed a short but wide popularity.

The next speaker was Professor Wenckebach who spoke on Boerhaave and the Viennese school. In the middle of the eighteenth century medical conditions were extremely unsatisfactory in Austria, and when Maria Theresa ascended the throne in 1740 she soon recognized that a thorough reform of the University of Vienna was essential if it was to remain a university in any sense of the word. Five years later she called a student of Boerhaave, Gerhard van Swieten, who reorganized not only the university but medical conditions at large. He in turn called one of his fellow students, Anton de Haen, to the chair of clinical medicine in Vienna, and it was de Haen who initiated the tradition that made Vienna famous as a clinical center throughout the world. It was a great pleasure to hear Professor Wenckebach discuss these developments, who is Dutch himself and who until his retirement a few years ago was Professor of Clinical Medicine in Vienna, thus holding the chair of de Haen.

The last speaker was Professor Dinger, who had come from Batavia and paid his tribute to Boerhaave in the name of Greater Holland. After the exercises, we all went to the monument of Boerhaave that faces the entrance of the hospital and wreaths were deposited in memory of the master. This reminded me of another wreath that we had deposited in front of the same monument in 1927 when the International Congress of the History of Medicine was held in Leiden. Dr. Welch then was the speaker.

After a luncheon tendered by the medical faculty, we assembled in the hospital garden for one more formal exercise. The students of the medical school wanted to pay their tribute to Boerhaave's memory also. They collected funds among themselves to erect a clock in the tower of the medical school building. A student delegate spoke. Dr. Maas, Superintendent of the hospital, answered and in the name of the hospital and medical school accepted the clock, which then was unveiled. It was a joy to see the young students, boys and girls, in the beautiful surroundings of the Boerhaave-Kwartier, and it reminded you of the fact that the medical school of Leiden not only has a great past but is a great medical center still, worthy of its glorious traditions.

And then the pilgrimage began. It was to bring us to all the places where Boerhaave had lived, which was easy to achieve as he had never left his country. He was in touch with the whole world. Seeds were sent

dropped, and tea was consumed by rich and poor. From 1717 to 1726 England imported annually about 700,000 pounds; from 1732 to 1742 annual imports into London increased to 1,200,000 pounds, and in 1755 duties were paid for almost four millions of pounds.¹

The consumption of tea had become such that physicians and moralists were alarmed. Among the latter, Jonas Hanway was one of the most articulate who in 1757 exclaimed pathetically:²

Will the *sons* and *daughters* of this happy isle, this reputed abode of *sense* and *liberty*, for *ever* submit to the bondage of so tyrannical a custom as drinking tea?

Must the *young* and *old*, and *middle aged*, the *sickly* and the *strong*, the *poor* and *rich*, in *warm* weather and *cold*, in *moist* and *dry*, with one common consent, employ so many precious hours, in so low a gratification as *drinking tea*?

Are we to be bred up from *generation to generation* to this vast expence?

Is not this a *want* which nature does not make, and are not many *unhappy*, if it is not regularly supplied? &c. &c.

One might multiply these questions, and their answers might at one view set the matter in its true light, if we had wit and honesty enough to consult proper counsellors, and to follow their advice. Men seem to have lost their stature, and comeliness; and women their beauty. I am not young, but methinks there is not quite so much *beauty* in this land as there was. Your very *chambermaids* have lost their bloom, I suppose by *sipping tea*. Even the agitations of the passions at *cards* are not so great enemies to female charms. What *Shakespear* ascribes to the concealment of love, is in *this age* more frequently occasioned by the use of *tea*.

"Like a worm i' the bud,
It feeds on the damask cheek."

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Jonas Hanway (1712-1786)³ was a merchant and philanthropist. Born in Portsmouth he was apprenticed to a merchant in Lisbon at the age of seventeen, and in 1743 he entered into partnership with a merchant in St. Petersburg who was engaged in the Caspian trade. The same year he conducted a caravan to Persia, where he had all kinds of adventures. He was caught in a rebellion and had his caravan looted; sailing back to Russia on the Caspian Sea his boat was attacked by pirates; stricken with fever he was quarantined on the island of Caraza. Finally, in 1745, he

¹ Jonas Hanway, *A Journal of Eight Days Journey from Portsmouth to Kingston upon Thames etc.*, ed. 2, London, 1757, vol. II, pp. 22-23. I do not vouch for the accuracy of the figures, since Hanway's statements are often rather superficial.

² *Ibid.*, pp. 36-37.

³ For the biography and bibliography see John Pugh, *Remarkable Occurrences in the Life of Jonas Hanway, Esq.*, London, 1787.

words "a malignant ulcer in his left thigh eluding the art of surgery and occasioning excessive pain." He finally cured it himself "by fomenting it continually with salt and urine," whereupon he conceived his first thought of studying medicine. At the age of fourteen he was sent to school in Leiden, and two years later he entered the university as a student of philosophy and theology. His father died when he, the oldest child, was not yet sixteen years of age, and the family was left in a difficult financial situation.

Our next station was Boerhaave's country house Oud-Poelgeest, in Oegstgeest near Leiden. The impecunious student of theology had become a world-famed wealthy physician. Patients from every country came to Holland to seek his advice: "From ten till twelve his consulting-room was thronged by those who sought his advice, for pressure of work now made it impossible for him to visit patients in their homes. Often enough the morning consultations outlasted the fixed hours, so that lecture time had come before he had had a moment in which to eat his dinner. At three in the afternoon, additional patients began to arrive. What remained of his day was spent in an extensive correspondence and in his long-continued labors upon the writings of the Greek physicians—unless some distinguished patient dragged him away from his work."⁶

No wonder that "wealth flowed to him from all parts, and it was supposed that his only daughter would inherit a few tons of it."⁷ Boerhaave purchased the beautiful country house that we visited and where a reception was tendered to us by the present owner, Mejonkvrouwe Willink van Bennebroek. The house is unfurnished at present and needs some repair but is still a grand mansion, surrounded by an old garden with a pond in front, and with a beautiful view of the flat land that surrounds Leiden. In addition to this country house Boerhaave had a city residence on the Rapenburg which we passed repeatedly, without visiting it, however.

The day ended with a banquet in Leiden, in the Huize Bruyns, a club famous for its excellent cuisine, and it was a very great pleasure to spend a few hours with our Dutch friends, who are doing such splendid work in medical history. J. G. De Lint, who organized the Institute of the History of Medicine and Science at the University of Leiden, died several years ago and was succeeded by F. W. T. Hunger, the eminent historian

⁶ Albrecht Haller, *Tagebücher seiner Reisen nach Deutschland, Holland und England 1723-1727*, mit Ammerkungen herausgegeben von Ludwig Hirzel, Leipzig, 1883, pp. 38-39.

⁷ *Ibid.*, p. 38.

hundreds of human lives: one passed in 1761 that provided for the registration of infants under parish care, and one of 1767 that directed that "all Parish Infants belonging to the Parishes within the Bills of Mortality, shall not be nursed in the Workhouses, but be sent to nurse a certain number of miles out of Town, until they are six years old, under the care of Guardians, to be elected triennially, for the express purpose of taking Care of them."

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In 1756 Hanway published a book with the title: *A Journal of Eight Days Journey from Portsmouth to Kingston upon Thames; through Southampton, Wiltshire, etc. with Miscellaneous Thoughts, Moral and Religious; in Sixty-four Letters: Addressed to Two Ladies of the Partie.*

It is a most insipid book. From Portsmouth to Southampton Hanway makes remarks on buildings and nunneries. From Southampton to White Parish he reflects on tombstones. At Salisbury he has thoughts on education, church music, and oratorios, on the theatre, and on divine poetry. From Salisbury to Langford he meditates about death and temperance. Till he arrives at Stourton he "ridicules a female fondness for animals and birds; and thence makes many weighty reflections"—on matrimony and such subjects. Thus he goes on disserting endlessly, and the reader thanks heaven when the party discussing "the advantages of female conversation" finally reaches its destination.

The book was printed for presentation only and was not on sale, but the following year Hanway published a second edition, corrected and enlarged, in two volumes which were sold. The second volume contained: *An essay on tea, considered as pernicious to health, obstructing industry, and impoverishing the nation: also an account of its growth, and great consumption in these kingdoms, with several political reflections; and thoughts on public love: in thirty-two letters to two ladies.*

Hanway had made a discovery. He had found the enemy that was sapping the vitality of the British people and was threatening it with physical, moral, and economic decay. It was that exotic shrub: tea. "O tempora, o mores!"

After an introduction on the growth of tea, the Chinese manner of drinking it and its introduction into England, an introduction that fills three letters to Mrs. O., Hanway launches his attack. Let us briefly summarize his argument.

It is well known that the Harderwijk students were a rough gang. In Dr. Penning's words:

With unflagging zeal the Academical Senate fought against the evil of wantonness, nocturnal uproar, vandalism, the catching and eating of somebody else's chickens, the so-called graduating of hens, fighting and drawing the rapiers; but all was without avail. Even the prohibition of all the students' clubs has never been able to put an end to the life of the so-called Little Senate of the students with its seal representing the Goddess Pallas seated on a wine-cask encircled by the words: "Sigillum majus Senatus minoris,"⁸

We know from Haller's diary that student life in Leiden was somewhat different:

Leiden seems to have been made on purpose most convenient for students. Life is utterly informal and you may walk in the streets in your dressing gown without any trouble. You do not mix with anybody but your own kind, for the Dutch are cold and their women-folk reserved with the so-called *Studiosi*, a fact that saves a man much money and many hours in the course of the year. One student encourages the other with his example and he who does not work must expect a life of boredom and tedious idleness. No kind of dissipation is made easy. Wine and all luxuries are expensive. And, finally, the departments, the professors' zeal and the organization of the University are incomparable and if a man does not feel like getting ahead here he certainly will not anywhere else.⁹

And yet when the students had passed their examinations they let loose in Leiden also—and they still do.

Boerhaave in all probability left the city the day after graduation, and there has been some discussion as to why Boerhaave made the trip to Harderwijk, why he did not prefer to take his degree from his own university, Leiden. The answer probably is that graduation at Harderwijk was cheaper, and for an impecunious student like Boerhaave this meant a great deal.

From the town hall we walked to the old building of the former academy. It was located in a church. Across the street was the Hortus Botanicus, with a tower that was used as a carcer, a jail for unruly students. Today the tower is adorned with the bust of another famous graduate of the academy, Linnaeus, who took his degree in 1735. On the same tower a beautiful tablet in green bronze, with Boerhaave's portrait in relief and an inscription in which the Dutch physicians pay tribute to the master, was unveiled, so that now Harderwijk's two greatest graduates are

⁸ C. P. J. Penning, "De Promotie van Boerhaave te Harderwijk," in *Nederlandsch Tijdschrift voor Geneeskunde* 82:4898, 1938.

⁹ *Op. cit.*, p. 274.

To this was to be added the amount of money spent for the sugar that was consumed with the tea, about 5 pounds of sugar to 1 pound of tea. Counting three fourths of the sugar at 4 pence and one fourth at 8 pence, the expenditure amounted to 525,000 pounds.

The next item in the bill was the time lost by working people in drinking tea. Supposing only one million servants, mechanics, and laboring people lost time in such a way, counting only 280 days and one hour in twelve lost on such days, with daily wages amounting to 6 pence, then tea would cost the nation in this instance 583,333 pounds.

The time lost by fine ladies and gentlemen was, of course, considered invaluable, but what had to be counted was the tea equipages of 333,333 families including two million tea drinkers. At 5 shillings each this item amounted to 83,333 pounds.

And finally one had to count the expense of teakettles and coals, considering that in certain seasons people made fire merely on account of their tea. At 15 shillings a year the charge amounted to 249,999.

And thus the people of Great Britain, not counting Ireland, spent annually 2,691,665 pounds. For what? For tea, for their own destruction. This was taking "a political and prudential view"; it was the grand object of Hanway's lucubrations, a language that Britishers would understand.¹¹

But then was not the East India Company to be blamed for importing the pernicious leaves and draining so much gold and silver from the country to China? Of course not. Hanway remained loyal to his fellow merchants. "The East-India Company ought to be considered by far the most respectable, and most useful trading company in the nation."¹² Its directors "may not think themselves obliged to be arithmetical politicians, nor to enter upon the consideration of what the nation gains or loses." "If it [the tea trade] is profitable to them, no body can doubt that it is a less evil to the nation, to pay nine-pence, or a shilling a pound to the Chinese, and enjoy all the profit arising from the navigation, than to employ French or English smuggling-vessels, to bring over tea, for which we pay from eighteen-pence to three shillings to the French, Dutch, Swedes, Danes, and Prussians."¹³

An argument frequently brought forth in favor of the tea trade was that it employed "five or six hundred seamen, and, consequently, many other industrious subjects to support them, together with six ships, which

¹¹ *Ibid.*, pp. 149-154.

¹² *Ibid.*, p. 179.

¹³ *Ibid.*, p. 181.

BOERHAAVE'S INFLUENCE UPON AMERICAN MEDICINE

WHEN Boerhaave died two hundred years ago, western medicine lost its undisputed master. Never before had a medical teacher exerted such a far-reaching influence. Never before had a physician been so universally admired and beloved. Hippocrates was an almost mythical figure, Sydenham was a great practitioner, but Boerhaave was "*communis totius Europae praeceptor*," and when he passed away, after a long and rich life, his many students all over the western world bemoaned him.

What was the cause of Boerhaave's unparalleled reputation? Not his career, nor his writings. His career was that of a highly successful professor and great practitioner, who was consulted by rich and poor and whose advice was sought by prominent people from many countries. But there were many other famous professors and practitioners at the time.

Boerhaave's writings, good as they are, cannot explain the master's fame either. Eclectic in character, they contain the essence of much experience in concise form but are by no means revolutionary. They do not reveal new discoveries or basically new thoughts, and medicine in all probability would have progressed just as much without them. The books did not create Boerhaave's fame. They became famous and were reprinted over and over again because they were Boerhaave's work.

The cause of the master's universal reputation is to be sought in his personality, in his fascinating personality as a clinical teacher and physician. Whoever listened to him, whoever had the privilege to attend his courses at the bedside of the patient in the two small wards of the hospital

M. DCC. LV.
 To
 the remembrance
 of the fair guardian spirits of
 BRITAIN,
 Whose influence and example
 abolished the use of
 a Chinese drug called
 TEA,
 the infusion of which had been for many years
 drank in these realms and dominions,
 injuring the health,
 obstructing the industry,
 wasting the fortunes,
 and exporting the riches,
 of his majesty's liege subjects:
 &c. &c.¹⁷

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Hanway's philippic did not remain unanswered, and counterattacks came from two very distinguished quarters. No English writer could possibly have had more personal experience in the subject than Samuel Johnson, who was known to be an inveterate tea drinker, who once drank twenty-five cups at a sitting. At the time when Hanway's book was published Johnson was editor of the short-lived *Literary Magazine, or Universal Review*.

He felt challenged by the essay on tea and reviewed the book in his journal,¹⁸ not without admitting that he was highly prejudiced in the matter: "but it can scarcely be candid, not to make a previous declaration, that he [Hanway] is to expect little justice from the author of this extract, a hardened and shameless tea drinker, who has for twenty years diluted his meals with only the infusion of this fascinating plant, whose kettle has scarcely time to cool, who with Tea amuses the evening, with Tea solaces the midnights, and with Tea welcomes the morning."

Johnson gives lengthy quotations from Hanway and ridicules the dreadful effects of tea he pictures, of which "some are perhaps imaginary, and some may have another cause. That there is less beauty in the present race of females, than in those who entered the world with us, all

¹⁷ *Ibid.*, pp. 276-277.

¹⁸ *Literary Magazine, or Universal Review* 2:161-167, 1757.

meant to replace the apprenticeship system but to supplement it, so as to combine scientific with practical instruction.

Those American students who went abroad were naturally inclined to study in their country of origin, in England or Scotland. In 1726 the medical faculty of the University of Edinburgh was founded, and throughout the eighteenth century American students went to this university in increasing numbers.

Other students studied in continental universities, particularly in France. And some went to Leiden and became students of Boerhaave. Their number is not large.¹

Lewis Johnston was matriculated at Leiden in 1729 and was graduated from Rheims in 1732. He was a New Yorker who later practiced in Savannah, Ga., where he became a member of the King's Council.

William Bull was born in South Carolina in 1710. He took his doctor's degree at Leiden in 1734 with a dissertation, *De Colica Pictonum*. He probably was the first American graduate of the University of Leiden. Back in his home country he did not practice medicine but took an active part in political life, became Lieutenant-Governor of South Carolina, was an ardent royalist in the Revolution, and left for England in 1782.

John van Beuren, descendant of a Dutch New-Amsterdam family, must have studied at Leiden at about the same time as Bull. He became a distinguished physician in New York, where he practiced over thirty years. In 1736 the city of New York opened a "Publick Workhouse and House of Correction," a combination of poorhouse and prison. An infirmary for the sick inmates was attached to it—the origin of Bellevue Hospital—and van Beuren was appointed physician in charge.²

Isaac Dubois was another New Yorker who studied under Boerhaave and was graduated after the master's death in 1740 with a dissertation, *De Sanguinis Missionis Usu et Abusu*. He practiced in New York and died from yellow fever a few years after his return.

Samuel Nicholson, a Marylander, was matriculated at Leiden in 1736. He never returned to America but practiced at Stockton-on-Tees.

Two Philadelphians, Phineas Bond and John Redman, studied medicine at Leiden after Boerhaave's death, Bond in 1742, Redman in 1747 and 1748, when he was graduated with a thesis, *De Abortu*.

The immediate American students of Boerhaave could not exert much

¹ They are listed in: Innes Smith, *English-Speaking Students of Medicine at the University of Leyden*, with foreword by John D. Comrie, Edinburgh and London, 1932.

² James J. Walsh, *History of Medicine in New York*, New York, 1919, vol. I, p. 26.

ruption of our people, let us at once resolve to prohibit it for ever." But Johnson is convinced that these are not the effects of that "fascinating plant."

Hanway resented the review. His secretary and biographer, John Pugh, said of it:¹⁹

The Doctor [Johnson], in his warmth, perceived not that Mr. Hanway's remarks were not intended for people in his line of life, and by this essay convinced their mutual friends, that he was not more superior to his adversary in learning, than inferior to him in affability and social benevolence.

The other refutation of Hanway came from Oliver Goldsmith who in 1757 was living with the bookseller Griffiths and was working for his periodical, *The Monthly Review or Literary Journal*. In the July number of 1757²⁰ he discussed Hanway's book. His review is much shorter and much kinder in tone than that of Johnson, beginning:

Mr. Hanway, who has already obliged the public with an account of his Travels into distant parts of the world, here presents the Reader with the result of his Travels nearer home. This Journal was, perhaps, at first designed for the amusement of his friends, and by their too partial applause he might have been tempted to send it into the world; however, he can lose little reputation tho' he should not succeed in an attempt of such a nature as this;²¹ especially as he has already shewn himself equal to subjects and undertakings that require much greater abilities. Novelty of thought, and elegance of expression, are what we chiefly require, in treating on topics with which the public are already acquainted: but the art of placing trite materials in new and striking lights, cannot be reckoned among the excellencies of this Gentleman; who generally enforces his opinions by arguments rather obvious than new, and that convey more conviction than pleasure to the Reader.

It will be remembered that Oliver Goldsmith had studied medicine at Edinburgh although he had never graduated.²² He resented the fact that Hanway discussed the effects of a drug and condemned it without being a doctor. After having summarized Hanway's arguments against tea and having quoted some essential passages, Goldsmith ended his review with the following words:

¹⁹ Pugh, *op. cit.*, p. 154.

²⁰ 17:50-54.

²¹ An allusion to a widely circulated *bon mot* of Johnson who had said that Hanway had acquired some reputation by traveling abroad, but had lost it all by traveling at home. See Boswell's *Life of Johnson*, Oxford, 1887, vol. II, p. 122.

²² He described Monro as the one great professor, and the rest of the doctor-teachers as only less afflicting to their students than they must be to their patients. See John Forster, *The Life and Times of Oliver Goldsmith*, London, 1871, vol. I, p. 49.

poisoned the nation. It sounds like irony when Hanway states that "the life of an infant born to labor, politically considered, may happen to be of more value than the life of a duke; and the laws of humanity permit of no distinctions in what is essential to the preservation of life,"²³ since we know that the lot of the infant born to labor was to labor for the duke.

How different were the Quakers, men like William and Samuel Tuke who did great social works without moralizing, or, then, the revolutionists like Rousseau who attacked the social evils at their root.

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Poor Hanway! If he came back to life today he would be terrified beyond words to find that, while the population of Great Britain increased about five times, its consumption of tea during the same period increased over eighty times, from five million pounds to 416,152,552 pounds in 1927.²⁴ And he would be extremely astonished to find that, in spite of this flood of tea, the nation, against all his expectations, did not decay. He would find that John Bull is as tough as ever and just now is putting up a gallant fight against a ruthless aggressor. Since he was an honest man and sincere patriot, Jonas Hanway, I am sure, would be delighted and would gladly admit—that he was wrong.

²³ Hanway, *op. cit.*, p. 112.

²⁴ *Encyclopaedia Britannica*, ed. 14.

promote sweats were generally of a feeble nature. The spiritus mindereri, and the spirit of sweet nitre were in daily use for that purpose. In dangerous cases, saffron and Virginia snake-root were added to them.

In the year 1765 the medical department of the College of Philadelphia was organized. It was the first medical school in the English colonies of America. It was founded upon the suggestion of Dr. John Morgan, who had taken his degree at Edinburgh in 1763 after having studied for six years with Dr. John Redman, who was a graduate of Leiden. Thus he had been exposed to the tradition of Leiden from two different sides.

Morgan's ambition was to create in Philadelphia an institution similar to the medical school of Edinburgh. In his famous *Discourse upon the Institution of Medical Schools in America*, he says:⁵

Of what consequence the united efforts of men learned in their profession are, the medical colleges of Edinburgh afford a remarkable instance. Within the space of little more than forty years, the present professorships in Medicine were first formed. A few gentlemen from Scotland, then prosecuting their medical studies at Leyden, concerted a plan, and undertook, themselves, the important charge of instituting schools for teaching the various branches of Medicine. They met with countenance and support from the patrons of the university, and by the great abilities, assiduity, and experience of those gentlemen, and some few of their successors, the reputation of that place is raised to such a height, that, to their immortal honour, it already rivals, if not surpasses that of every other school of Physic in Europe. The names of Drummond, Dick, Clerk, Rutherford, Sinclair, Alison, Plummer, Monroe, Whytt, Cullen, Hope, Black and some others, are now known wherever the knowledge of Physic is cultivated; and they are revered at home as parents and guardians of the healing arts. There is a great resort of medical students at the university of Edinburgh, as well from Great Britain, Ireland and the West-Indies, as from the Continents of Europe and America. These bring to the university and city considerable advantages, and, in return, carry the fame of their learning and their professors to every quarter of the globe. Were it necessary I could easily enumerate many similar instances of the improvement of science; but these, I imagine, will suffice for the present.

Why should we be deterred from establishing like institutions of Medicine in this seminary, especially as so many circumstances conspire to invite and encourage so important an undertaking.

Morgan stressed the necessity of theoretical studies for the practitioner and referred to Boerhaave as an example:⁶

The great Boerhaave, whose example is worthy of imitation, laid it down to himself, as an inviolable law, to divide his time between study and practice.

⁵ Philadelphia, 1765, pp. 28-30.

⁶ *Op. cit.*, p. 43.

— IV —

PERSONAL HISTORY

MEDICAL HISTORY IN THE
UNITED STATES:
PAST—PRESENT—FUTURE:
A VALEDICTORY ADDRESS

LOOKING through my files I found that I had the honor to address this club for the first time on October 26, 1931. I was then in charge of the Institute of the History of Medicine at the University of Leipzig and had come for several months to Johns Hopkins as visiting lecturer. Fielding H. Garrison was President of the club, John Rathbone Oliver was its Secretary, and Dr. Welch was the driving spirit who attracted large crowds. Whenever it was known that he would attend a meeting of the club, and he rarely missed one, you could count on a capacity audience because faculty members, students, doctors from the city, personal friends, men and women, flocked to the lecture hall to see him, to greet him, to listen to the remarks which he invariably made after every paper, and which sometimes were as long as the paper itself.

I was well aware that I was addressing the oldest society of medical history anywhere in the world which was still active. The corresponding French, German, and Italian societies were all organized after 1900, while this club was founded in the library of the Johns Hopkins Hospital on the tenth of November, 1890, by Osler, Welch, Kelly, and some thirty other Hopkins doctors. When its fiftieth anniversary was celebrated in 1940, one of the founders and prime movers, Dr. Howard A. Kelly, was still alive and addressed the club then as he had done fifty years before.

.....
Read before The Johns Hopkins Medical History Club on May 14, 1947.

In the seventeenth and early eighteenth century Sydenham was the dominating influence in American medicine. Boerhaave's method and principles were leading in the eighteenth century until they were superseded in the last quarter of the century by the theories of Cullen and Brown, which enjoyed a short but wide popularity. William Cullen's *Nosology* was published in 1769, his *First Lines on the Practice of Physic* from 1776 to 1784, and John Brown's *Elementa Medicinæ* appeared in 1780. Benjamin Rush was largely responsible for the spread of Brown's ideas. He was a very forceful teacher, and his opinions carried much weight. Although he claimed to have a system of his own, yet it was nothing but modified Brownian theory. In the pamphlet quoted before, he pictures the development as follows:⁸

I proceed, in the order that was proposed, to take notice of the present medical opinions which prevail among the physicians of Philadelphia. The system of Dr. Boerhaave long ago ceased to regulate the practice of physic. It was succeeded by the system of Dr. Cullen. In the year 1790, Dr. Brown's system of medicine was introduced and taught by Dr. Gibbon. It captivated a few young men for a while, but it soon fell into disrepute. Perhaps the hightoned diseases of our city exposed the fallacy and danger of the remedies incalculated by it, and afforded it a shorter life than it has had in many other countries. In the year 1790, the author of this inquiry promulgated some new principles in medicine suggested by the peculiar phaenomena of the diseases of the United States. These principles have been so much enlarged and improved by the successive observations and reasonings of many gentlemen in all the states, as to form a new system of medicine. This system rejects the nosological of diseases, and admits only of a single disease, consisting in different forms of morbid excitements, induced by irritants acting upon previous debility. It rejects further, an undue reliance upon the powers of nature, and teaches, instantly to wrest the cure of all violent and feeble diseases out of her hands; and lastly it rejects prescriptions for the names of diseases; and by directing their application wholly to their forming and fluctuating states, derives from a few active medicines all the advantages which have been in vain expected from the numerous articles which compose European treatises upon the *materia medica*.

This system has been adopted by a part of the physicians of Philadelphia, but a respectable number of them are still attached to the system of Dr. Cullen.

In the beginning of the nineteenth century Paris became the center of attraction for American physicians, and this marks the beginning of a new period in the history of American medicine.⁹

⁸ B. Rush, "An Inquiry into the Comparative State of Medicine in Philadelphia, between the years 1760 and 1766 and the year 1809," in B. Rush, *Medical Inquiries and Observations*, ed. 3, Philadelphia, 1809, vol. IV, pp. 409-410.

⁹ I wish to thank Miss Genevieve Miller for the help she has given me in gathering the material for this paper.

quarter of the nineteenth century, to the time when American medicine was making a great effort to catch up with Europe, one in which it succeeded so well.

Medicine was no longer the craft it had been, but it had become very scientific. A new pathology and clinic had established well-defined disease entities, and in examining a patient the doctor could no longer be satisfied with ascertaining that he was suffering from a continuous or intermittent fever, from a bilious attack or some equally vague condition. With all scientific means available he now had to make an accurate diagnosis of the disease and of the individual, and this determined his further actions.

Was there still room for a study of medical history? The old literature reflected a different concept of disease, knew nothing of the new methods of diagnosis, was ignorant of many new treatments, surgical and others. It is highly significant that the men who inaugurated our hospital and school of medicine and made it famous in the world, the men who revolutionized medical education in this country and brought modern scientific medicine to it, who probably more than anybody else in American medicine made history at that time, that they were all keenly interested in medical history. They were medical humanists who were conscious of the point in the historical development at which they stood. Their teaching was scientific but imbued with humane and historical considerations, and today still you may recognize their students by their broader culture.

In this development John Shaw Billings played a decisive part which has sometimes not been appreciated sufficiently because his was an austere personality very different from the jovial nature of an Osler or a Welch. On the occasion of the hundredth anniversary of his birth in 1938 we tried to do justice to the enormous contribution he made to the school, to medical education, and to medical history.¹

As early as 1876 Billings accepted an appointment as Lecturer in the History of Medicine at the newly opened Johns Hopkins University. During the academic year 1877-1878 he gave a famous series of twenty lectures on medical history, medical legislation, and medical education. In an address to the Medical and Chirurgical Faculty of the State of Maryland delivered in 1883 he made a strong plea for a course in the history and bibliography of medicine to be given at the Hopkins School of Medicine whenever it would be opened. And on another occasion he

¹ See the John Shaw Billings Memorial Number, *Bulletin of the Institute of the History of Medicine* 6:223-398, 1933.

the first English translation of the Latin verses of the *Regimen Sanitatis Salernitanum*. The *Regiment of Helthe* of Thomas Paynell, published repeatedly from 1530 on, gave the text in Latin and translated merely the commentary of Arnald of Villanova.

The water closet is described in one of Harington's earlier writings, a satire in the Rabelaisian vein published anonymously in 1596 under the title *A New Discourse of a State Subiect. Called the Metamorphosis of Ajax: Written by Misacmos to his friend and cosin Philostilpnos*.

It was followed the same year by several pamphlets, also anonymous, on the same subject, the most notable of which was: *An Anatomie of the Metamorphosed Ajax. Wherein by a tripartite method is plainly, openly, and demonstratiuely, declared, explained, and eliquidated, by pen, plot & precept, how unsauerie places may be made sweet, noysome places made wholesome, filthy places made cleanly. Published for the common benefite of builders, housekeepers, and house-owners. By T. C.³ Traueller. Apprentice in Poetre, Priactiser in Musicke, professor of Painting, the mother, daughter, and handmayd of all Muses artes and sciences.*⁴

Ajax is a pun, standing for "a jakes." Harington's fictitious cousin Philostilpnos had heard much of the wonders of his house, the pictures, walks, ponds, swimming place, and boats.

But to deale plainly with you, where be three speciall things that I haue heard much boasted of and therefore would willinglyst see. The one a Fountaine standing on pillers, like that in Ariosto, vnder which you may dine & suppe; the second a shooting close with a xii. score marke to euery point of the card, in which I heare you haue hit a mark that many shoot at, viz: to make a barren stony land fruitfull with a little cost; the third is a thing that I cannot name wel without saue-reuerence, & yet it sounds not vnlike the shooting place, but it is in playne English a shyting place. Though it be so sweet and so cleanly as I heare, it is a wrong to it to vse saue reuerence, for one told me it is as sweet as my parlor and I would thinke discortisie, one should say, saue-reuerence my parlor. But if I might entreat you (as you partly promist me at your last being here) to set down the maner of it in writing, so plaine as our grosse witts here may vnderstand it, or to cause your man M. Combe (who I vnderstand can paynt pretily) make a draught, or plot thereof to be well conceaued, you should make many of your friends much beholding to you, & perhaps you might cause reformation in manie houses that you wish wel vnto, that will thinke no scorne to followe your good example. Nay to tell you my opinion seriouslye, if you

³ Thomas Combe, Harington's servant.

⁴ The *Metamorphosis* and the *Anatomie* were reprinted from the original editions in 1927, edited by Peter Warlock and Jack Lindsay, with an Introduction by Jack Lindsay. London, Fantolico Press. Our quotations are from this edition.

try in addition had a national organization, the *American Association of the History of Medicine*, founded after the first World War and enlarged in structure and scope in 1938. There obviously is a great diversity among the various local groups. Some are very active and some not; some clubs in universities consist mostly of faculty members, while others are student societies; some are historical sections of medical societies, others medical history sections of historical societies. But wherever there is such a group, limited as its activities may be, there is a focus of humanism which cannot but exert a certain influence on the medical profession.

The early days of the Johns Hopkins Club were also the days when large medicohistorical collections were assembled. The collectors have played an extremely important part in American medical history. In Europe old medical books, manuscript and printed, are available in every university library as a matter of course, because most universities were founded in the late Middle Ages or during the Renaissance and the books that they used at the time are still there. In old abbeys like Monte Cassino or St. Gall, medical manuscripts written by monks in the early Middle Ages are still on the spot where they had been written originally.⁴ In America, however, the early colonists brought along few medical books. Many were used up and fell to pieces in the pioneer days. But books and documents are the chief tools of medicohistorical research, and the collectors who spent time and money intelligently acquiring the tools, using them, and then donating them to a university created the conditions that made further research possible. Through John Billings' efforts the Surgeon General's Library in Washington became not only the national medical library but also the country's foremost medical historical collection. One such center, however, was not enough in a country of such vast dimensions, and this is where the private collectors stepped in, creating new centers.

In this movement the Baltimore group played a very distinguished part. Osler's choice collection is now enshrined at McGill University, and its catalogue is one of our major bibliographies. Under the leadership of Dr. W. W. Francis the collection has become an active center of studies, and it is not by accident that the Osler Medal, awarded annually by the American Association of the History of Medicine for the best essay presented by an American or Canadian student of medicine, was granted in two consecutive years to McGill students.

⁴ Those of Monte Cassino temporarily transferred to the Vatican will be returned as soon as the abbey is rebuilt.

Now therefore to come where we left last, for I knowe you woulde faine haue your enstruptions ere you goe home, as soone as I haue giuen my horse some breath vp this hill I will ride along with you, so you will ride a sober pace: for I loue not to ride with these goose chasing youthes, that post still to their iourneies end, and when they come thither, they cannot remember what businesse they haue there, but that they had euen as much in the place they came from.

These inconueniencies beeing so great, & the greater because so generall, if there be a way with little cost, with much cleanlinesse, with great felicitie, and some pleasure to auoide them, were it not rather a sin to conceale it then a shame to vtter it? Wherefore shame to them that shame thinke, for I will confesse franckly to you, both howe much I was troubled with the annoyance, and what I haue founde for the remedies. For when I found not onely in mine owne poore confused cotage, but euen in the goodliest & statliest palaces of this realme, notwithstanding all our prouisions of vaults, of sluces, of grates, of paines of poore folkes in sweeping and scouring, yet still this same whorsom sawcie stinke, though he were commanded on pain of death not to come within the gates, yet would spite of our noses, euen when we wold gladliest haue spared his company, prease to the faire Ladies chambers. I began to conceiue such a malice against al the race of him, that I vowed to be at deadly feud with them, till I had brought some of the chiefest of them to vtter confusion. And conferring some principles of Philosophy I had read, & some conueiances of architectur I had seen, with some deuices of others I had heard, and some practises of mine owne I had payed for, I founde out at last this waye that is after described, and a maruellous easie and cheape waye it is, and I dare speake it vpon my credite, not without good experience, that though it bee neyther farre fetched, not deare bought, yet it is good for Ladies, and there be few houses that may not haue the benefite of it. For there bee fewe greate and well contriued houses, but haue vaults and secret passages made vnder ground, to conuey away both the ordure and other noisome thinges, as also the raine water that fallies into the courtes, which being cleanly in respecte of the eye, yet because they must of force haue many vents, they are oft noisome in regarde of the smell. Specially in houses of office, that stande highe from the ground, the tuns of them drawing vp the aire as a chimney doth smoke. By which it comes to passe many times (specially if the winde stand at the mouth of the vaults) that what with fish water comming from the kitchens, bloud & garbage of foule, washing of disbes and the excrementes of the other houses ioined together, and all these in moyste weather stirred a little with some small streame of rayne water, for as the prouerb is.

Tis noted as the nature of a sinke,
Euer the more tis stirde, the more to stinke.

I say these thus meeting together, make such a quintessence of a stinke, that if Paracelsus were aliue, his art could not deuise to extract a stronger. Now because the most vnauoidable of al these things that keepe such a stinking stirre, or such a stinke when they be stirred, is vrine and ordure, that which we al cary about vs (a good speculation to make vs remember what we are, and whither we must) therefore as I said before, many haue deuised remedies for this in times past, some not many yeares since, and I this last yeare, of all which I will make choice onely of

and will lead ultimately to the compilation of a much-needed handbook.⁵

In the beginning of our century the teaching of medical history in the medical schools of the country had made little progress. In 1904 Eugene Cordell, the distinguished historian of medicine of Maryland, Honorary Professor of Medical History and Librarian of the University of Maryland School of Medicine, was President of the Medical and Chirurgical Faculty and delivered his presidential address on "The Importance of the Study of the History of Medicine."⁶ He had surveyed conditions in the fourteen leading medical schools (Harvard, Yale, Cornell, New York, Columbia, Pennsylvania, Virginia, Chicago, Michigan, Tulane, Johns Hopkins, Maryland, Minnesota) and had found that only three (Pennsylvania, Maryland, Minnesota) were offering full courses of fourteen to sixteen lectures. At Johns Hopkins, Billings was giving only three lectures a year at that time, but the students took an active part in the life of the club. At Yale five or six lectures were given by the professor of therapeutics, and Harvard reported that a course had been attempted but had been discontinued for lack of interest. Cordell concluded his report with a very strong statement:⁷

Let us now sum up some of the advantages of the study of medical history that have been pointed out in this address:

1. It teaches what and how to investigate.
2. It is the best antidote we know against egotism, error and despondency.
3. It increases knowledge, gratifies natural and laudable curiosity, broadens the view and strengthens the judgment.
4. It is a rich mine from which may be brought to light many neglected or overlooked discoveries of value.
5. It furnishes the stimulus of high ideals which we poor, weak mortals need to have ever before us; it teaches our students to venerate what is good, to cherish our best traditions, and strengthens the common bond of the profession.
6. It is the fulfilment of a duty—that of cherishing the memories, the virtues, the achievements, of a class which has benefited the world as no other has, and of which we may feel proud that we are members.

Having now shown the value—nay, I should rather say the necessity—of the study of medical history, I shall conclude with a few words regarding its teaching. So important a branch should receive the highest consideration. It should be taught in no desultory fashion, but as thoroughly as any other. There should be a full chair of the history of medicine in every university. A systematic course of reading should

⁵ The very good *Handbook of Medical Library Practice*, edited by Janet Doe, Chicago, American Library Association, 1943, has a brief chapter on medical historical collections in America [pp. 295-302] which, however, includes only the outstanding collections.

⁶ It was published in the *Medical Library and Historical Journal* 2.268 282, 1904.

⁷ *Ibid.*, p. 281.

that if for the drye lande seruice hee bee generall, for the water seruice I will bee Admirall. . . . Yet I assure you this deuise of mine, requires not a sea of water, but a cesterne: not a whole Teams full, but halfe a tunne full, to keepe al sweete and sauorie: for I will vndertake, from the pesants cottage, to the princes pallace, twise so much quantitie of water as is spent in drink in the house will serue the turne: which if it were at Shaftsburie, where water is deereest of anie towne I know, that is no great proportion. And the deuise is so little combersome, as it is rather a pleasure then a pain, a matter so sleight that it will seeme at the first incredible, so sure, that you shal find it at al times infallible. For it dooth auoide at once all the annoyances that can be imagined, the sight, the sauor, the colde; which last, to weake bodies, is oft more hurtful, then both the other wher the houses stand ouer brooks, or vaults daily cleansed with water. And not to holde you in too long suspence, the deuise is thys: You shall make a false bottome to that priuy that you are annoyed with, either of lead, or stone, the which bottome shall haue a sluice of brasse to let out all the filth, whiche if it be close plaistered, al about it, & renced with water, as oft as occasion serues, but specially at noone and at night, will keepe your priue as sweete as your parlour, and perhaps sweeter too, if Quaile and Quando be not kept out. But my seruauant Thomas (whose pensill can performe more in thys matter then my penne) wyl set downe the forme of this by it selfe in the ende beereof, that you may impart it to suche friendes of yours, as you shall think worthy of it, though you put them not to so great penance, as to read this whole discourse.⁷

The subject is taken up again with technical details in *An Anatomie of the Metamorphosed Ajax*:⁸

Wherefore now, seriously and in good sadnesse to instruct you, & all Gentlemen of worship, how to reforme all vnsauerie places of your houses, whether they be caused by priues, or sinkes, or such like (for the annoyance comming all of like causes, the remedies neede not be much vnlike,) this you shall do.

In the Priue that annoyes you, first cause a Cesterne containing a barrell or vpward, to be placed either behind the seat, or in any place either in the roome, or aboue it, from whence the water may by a small pype of leade of an inch be conuayed vnder the seate in the hinder part thereof (but quite out of sight) to which pype you must haue a Cocke or a washer to yeeld water with some pretie strength, when you would let it in.

Next make a vessell of an ouall forme, as broad at the bottome as at the top, ij. foote deep, one foote broad, xvi. inches long, place this very close to your seate, like the pot of a close stoole, let the ouall incline to the right hand.

This vessell may be breck, stone, or leade, but whatsoeuer it is, it should haue a Current of 3. inches to the backe part of it, (where a sluice of brasse must stand) the bottome, and sides all smooth: and drest with pitch, rosin, and waxe, which will keepe it from taynting with the vrine.

In the lowest part of this vessell, which will be on the right hand, you must fasten

⁷ *Ibid.*, pp. 85-89, 94-95.

⁸ *Ibid.*, pp. 113-114.

eases, of attempts to promote health, to prevent illness, to cure and rehabilitate the sick in antiquity and thereafter. Such work, however, requires expert knowledge, people trained in the methods of historical and philological research, men and women who can devote their entire time and energy to the task, because historical research is frightfully time consuming.

§

This is why the creation of the Institute of the History of Medicine at this university in 1929 acquired such significance. For the first time in America, scholars were given an opportunity to devote all their efforts to medical history. We must be deeply grateful to Dr. Welch for the vision and foresight he had in creating this center. Keenly interested in medical history, he, unlike his colleagues, was never a collector of old books. He was presented with many rarities, but as soon as he had read them he passed them on to the library. We are indebted to the Rockefeller Foundation, which made the establishment of the institute possible through various generous grants and even increased its yearly appropriation during the difficult days of the depression. I would also like to recall here the great services that Dr. Lewis A. Weed, Director of the School of Medicine, rendered to our cause. He took a most active part in planning the building of the Welch Medical Library, and after having worked in it for over fifteen years I can testify that the plan was a very good one.

It was in 1932 that I took over after Dr. Welch had retired from the last of his many positions in this university. The institute was the only one of its kind in America, and it seemed obvious to me that we should make an effort to cover as wide a field of medical history as possible. This, however, required a highly specialized and diversified staff. Dr. John Rathbone Oliver was an associate in the department when I came. He was a highly cultured gentleman of whom I soon became very fond. A priest, a classical philologist, practicing psychiatrist, and a popular novelist in addition, he obviously had little time to spare for the department. Dr. Fielding H. Garrison, after his retirement from the Surgeon General's Library in Washington, had been appointed Librarian of the Welch Medical Library and Lecturer in the History of Medicine. He brought great prestige to the institute, but his energy was largely absorbed by being the librarian of the fifth largest medical library in the country, of the largest university medical library, and this at a time when

Faire Dames, if any tooke in scorne and spite
 Me, that *Misamos* Muse in mirth did write.
 To satisfie the sinne, loe, here in chaines,
 For aye to hang, my Master me ordaines.
 Yet deeme the deed to him no derogation.
 But deign to this deuice new commendation,
 Sith here you see, feele, smell that his conueyance
 Hath freed this noysome place from all annoyance.
 Now iudge you, that the work smock, enuie, taunt,
 Whose seruice in this place may make most vaunt:
 If vs, or you, to praise it, were most meet.
 You, that made sowre, or vs, that make it sweet?

Thus the water closet began its triumphant course in an aura of poetry. But it was a slow course. Only a few rich people followed the Queen's example. In France at the time of Louis XVI there was one *lieu à l'anglaise*—this was the technical term—in the palace of Versailles¹⁰ but none in the Tuileries nor in Saint-Cloud where the *chaise percée* reigned supreme. Various patents for improved models of water closets were issued toward the end of the eighteenth century, particularly in England, in 1775 to Alexander Cummings, a watch-maker, in 1777 to Samuel Prosser, a plumber, in 1778 to Joseph Bramah, known for many mechanical inventions.¹¹ But we do not know whether any use was ever made of these patents, and it was only in the nineteenth century that water closets were actually built more frequently.

Most literary historians who wrote about Harington have wondered why so useful an invention that gives us so much comfort was not accepted generally and immediately. Jack Lindsay, in his very witty introductory essay on Harington and the *Metamorphosis*, even went so far as to speculate what would have happened if for once mankind had shown itself receptive to an idea.¹² Every alderman would have bought and read the book. In ten years England would have been sewered. Scholars would have written tomes on the Cloacae of Rome. Charles I would not have needed to erect a gibbet at the gate of Woodstock Castle to hang people evading plague quarantine. There would have been no Great Plague of London, no Great Fire, etc., etc.

Alas, there were good reasons why mankind did not show itself more

¹⁰ Cabanès, *Moeurs Intimes du Passé*, Paris, n. d., p. 383.

¹¹ Glenn Brown, *Water-closets. A Historical, Mechanical and Sanitary Treatise*, New York, 1884.

¹² *Op. cit.*, p. xxviii ff.

lowships in Graeco-Roman science were created in 1941. They brought Dr. I. E. Drabkin and Dr. G. Raynor Thompson, two very promising young classical scholars, to the institute. The fellowships would in all probability have been continued had the war not interfered.

Another former European student of mine who joined the staff as Research Fellow, although very much later, was Dr. Erwin H. Ackerknecht. The inaugural dissertation that he wrote at the Leipzig Institute was a brilliant study on the medical reform movement of 1848.¹³ After specialized training in psychiatry he studied social anthropology and came to us as a man equally well equipped in medicine, history, and ethnology, a rare combination. He also branched out into the history and geography of disease with a monograph on malaria in the upper Mississippi Valley 1760-1900, which attracted a great deal of attention.¹⁴

My intention was by no means to run the department with Europeans alone, but I needed a few of them to fill in gaps that I could not close otherwise at that time, and I am glad to say that I was able to save and to win for America some valuable European scholarship that would have been engulfed in the cataclysm only a few years later. I was very anxious to have Americans on my staff. In the beginning I had the cooperation of Dr. Oliver and Dr. Garrison. It was a great joy to have Dr. Sanford V. Larkey join our group when in 1935 he succeeded Dr. Garrison as Welch Librarian and Lecturer in the History of Medicine. A Doctor of Medicine of the University of California, a Master of Arts of Oxford, a former Fellow of the Huntington Library, he brought a great deal that we had not in such measure, his knowledge of English history, of English literature, medicine, and science. With H. L. F. Lutz and C. D. Leake he had collaborated on the translation and annotation of the Egyptian Papyrus Hearst, had worked on the English translation of Vesalius and on many aspects of Elizabethan medicine.

It was clear to me from the very beginning that an American institute of the history of medicine must also cultivate the history of American medicine. The first book I wrote in my new position was one on American medicine,¹⁵ because I felt very strongly that I myself must be familiar with its history. Miss Genevieve Miller became our specialist in the field.

¹³ "Beiträge zur Geschichte der Medizinalreform von 1848," *Archiv für Geschichte der Medizin* 25:61-110, 113-183, 1932.

¹⁴ "Malaria in the Upper Mississippi Valley, 1760-1900," supplements to *Bulletin of the History of Medicine*, no. 4, Baltimore, 1945.

¹⁵ *American Medicine*, New York, W. W. Norton, 1934.

A LITERARY CONTROVERSY OVER TEA IN EIGHTEENTH CENTURY ENGLAND

EUROPE owes its acquaintance with tea to the Dutch East India Company. The company was founded in 1602, and as early as 1610 it brought the first tea leaves from Bantam to Holland. Before that time, in the sixteenth century, missionaries had brought samples of tea from China together with other drugs, but the history of tea drinking in Europe begins with the activities of the Dutch East India Company.

Somewhat later, in 1638, tea was brought from China to Russia by a diplomatic mission of the Tsarist court. Holland supplied other western European countries with tea. The new drug was first known in Paris in 1635 and was brought from Holland to England between 1650 and 1655. It is obvious that the British East India Company did not miss the opportunity of importing an article of consumption that promised to become popular. Its first shipment of tea reached England in 1660.

Thus England came to know the new drug relatively late, but in the consumption of tea it soon caught up with other European countries and surpassed them very rapidly. A beverage that had such a delicate flavor, or rather such a wide scale of flavors, that was delightfully stimulating without being intoxicating, could not but have a wide appeal. In the seventeenth century the price of tea was very high, so that its consumption was limited to the propertied classes, but in the eighteenth century under the pressure of a growing demand imports were increased, prices

In its researches the institute endeavored to cover the whole field of medical history. What it achieved and where it failed is illustrated best by the bibliography published in this same number of the bulletin. A new institute called for new means of publication. A journal was planned by Dr. Welch from the very beginning. We launched it in 1933 very cautiously as a supplement to the *Johns Hopkins Hospital Bulletin*, became independent two years later, and joined forces with the American Association of the History of Medicine in 1939. It was foreseen that the institute, in addition to papers, would publish monographs and also texts and documents. It struck me, moreover, that many of the classics of American medicine were extremely difficult to find. They had been used up in the pioneer days. This called for a third series of books. The institute was also extremely fortunate in having a visiting lectureship created by a generous grant of Dr. Emanuel Libman of New York and named in honor of the great Japanese investigator Hideyo Noguchi. I thought that it would add to the dignity of the lectures if they were published in book form. And thus we suddenly had, in addition to the journal, four series of books. Looking back today, after having been an acting librarian for three years, I think that, if I had to launch our publication program over again, I would not start out with four series but would have all our books in one series, which would be much easier to handle.

The history of medicine is both history and medicine. It is one aspect of the history of civilization and part of the theory of medicine. The historical analysis is a method that can be applied profitably in medicine, as in other fields, to clarify concepts, to make trends and developments conscious so that we may face them openly and may act more intelligently. When you pursue your historical studies into the present, you imperceptibly enter the field of sociology and begin to see that an infinite number of nonscientific factors, social, economic, political, philosophical, religious, may well determine success or failure of medicine, factors which must be investigated.

History makes a solid foundation for such studies, and I had plans for developing the institute in such a way that it would have consisted of two divisions, one of the history of medicine and one of the sociology and economics of medicine. The amount of money required for such an extension was not large. No construction was needed and the Welch library was rich in books on the subject and could easily have acquired some more material. What was needed besides some equipment was several staff members, and just at that time some excellent men were avail-

found himself back in St. Petersburg, where he learned that a relative of his had died and had left him money, more than he could ever make in the Caspian trade. He decided to go home, was back in England in 1750, and did what one does in such a case: he wrote a four volume book about his travels which was published in 1753 under the somewhat lengthy title: *An Historical Account of the British Trade over the Caspian Sea, with the Author's Journal of Travels from England, through Russia, into Persia, and back through Russia, Germany, and Holland: To which are added, the Revolutions of Persia, during the present Century, with the particular History of the great Usurper, Nadir Kouli.*

The book had several editions, and from being a merchant Hanway became a writer. Once he took up the pen he never dropped it and produced a large number of books and pamphlets. His bibliography lists over seventy items, which cover a very wide field because Hanway had become increasingly interested in public affairs. He wrote about the naturalization of the Jews and about the improvement of the highways of London. He was a cofounder of the Marine Society that endeavored to supply sailors to the navy. In 1758 he was appointed a governor of the Foundling Hospital, and he drew up a "Plan for a Magdalen House for Repentant Prostitutes." He organized a club for young chimney sweeps, wrote against "vailsgiving," or tipping, and against midnight routs. He advocated solitary confinement of prisoners and had much advice to give, "to a Daughter on her going to Service," "from a Farmer to his Daughter," "Moral and Religious Advice to Soldiers," "Moral and Religious Advice to Seamen," "Earnest Advice, particularly to Persons who live in an habitual Neglect of our Lord's Supper." He had prayers for everybody, "for the Parish Poor," "Prayers suited to the Condition of the Women," "Prayers for various occasions." He wanted more Sunday schools and a more vigorous police, and he was supposed to have been one of the first to walk the streets of London armed with an umbrella. "From Hanway to Chamberlain, a History of the Umbrella in British Life"—what a beautiful subject for a doctoral dissertation!

Hanway's endeavors to improve the lot of the infant parish poor represent by far the most important of his philanthropic activities.⁴ Conditions in the parish workhouses were scandalous. An infantile death rate of 100 per cent was not uncommon. Hanway's publications and his relentless efforts were responsible for two Parliamentary bills which saved

⁴ See Ernest Caulfield's excellent book, *The Infant Welfare Movement in the Eighteenth Century*, New York, 1931.

ested in this field, but today the School of Medicine has a Department of Preventive Medicine and the School of Hygiene offers instruction in the administration of medical care, so that the institute may have to revise its program or will have to coordinate it more closely with that of other departments.

And otherwise our plan of instruction endeavored to fill in gaps wherever we found them and to satisfy needs when they became articulate. Courses were given to first year medical students in Greek and Latin terminology. When during the war there was among the students a great demand for general orientation, we gave every year a course on the historical foundations of the present world conflict. When more and more students asked for instruction in philosophy, the department offered courses in philosophy. If students wanted to learn Greek, which happened more than once, we taught them Greek. We could do it because we had a highly diversified staff, and I think that an institute like ours is particularly important in a medical school which is located so far from the academic division of the university that students cannot attend courses of other schools. The courses have to be brought to them. All in all we offered every year from twelve to fifteen courses.

It is only fair to say that we served not only the university but the whole country. The number of manuscripts we read, of queries we answered, of visitors we advised, of lectures we gave every year out of town was very large indeed, and three times we gave postgraduate courses, graduate weeks, during which all the resources of the institute were mobilized and placed at the disposal of the participants.

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And now let us look for a moment into the future. When Cordell in 1904 made his survey he found that only seven of the schools reviewed offered courses in medical history. A new survey was made in 1937 by the American Association of the History of Medicine,¹⁸ which revealed that fifty-four medical schools, or seventy per cent, offered courses in the history of medicine. It is very likely that many of these courses were below the general standard of instruction of the various schools and that they were not given by men actively engaged in research in the field. Nevertheless, the mere fact that fifty-four schools considered medical history important enough to be taught to students showed that interest in

¹⁸ *Bulletin of the History of Medicine* 7:627-662, 1939.

Tea is not a remedy as some people have claimed; it does not cure scurvy but, on the contrary, produces diseases, particularly since it is consumed hot. All hot drinks are bad. They put the animal spirits into such an agitation as to prevent sleep. Hot tea causes weak nerves, paralytic disorders, "and those called nervous," particularly in women: "To what can we ascribe the numerous complaints which prevail? How many sweet creatures of your sex, languish with a weak digestion, low spirits, lassitudes, melancholy, and twenty disorders, which in spite of the faculty have yet no names, except the general one of nervous complaints? Let them change their diet, and among other articles leave off drinking tea, it is more than probable the greatest part of them will be restored to health."⁵

Hot tea is also very bad for the teeth. "The women in the united provinces who sip tea from morning till night, are also as remarkable for bad teeth. They also look pallid, and many are troubled with certain feminine disorders arising from a relaxed habit."⁶ What is tea anyway? Not a nutriment, not a liquid to quench thirst, "for the sugar makes them thirsty"; it is an idle custom, an absurd expense, "tending to create fantastic desires, and bad habits"; it drives more people to the doctor than all other debaucheries, and "were the college of physicians to set on tea, I apprehend they would do more real benefit to this country, than the Conclave ever did to the cause of true religion at Rome."⁷

Tea kills people. "Were we to reckon that only one in a thousand dies annually of this slow poison, out of two millions of tea-drinkers, the state would suffer the heavy loss of two thousand subjects."⁸ Since tea has been in fashion, even suicide has been more familiar than in times past.⁹ Tea kills not only adults but innocent infants. Indeed when parish nurses spend their allowances on tea, how could they feed the children?¹⁰

Tea not only destroys the people's health and very life but causes serious economic losses to the country. Hanway estimated that the annual consumption of tea amounted to five million pounds, including the tea that was not imported legally but was smuggled in. The price of a pound varied from 2 shillings 6 pence to 20 shillings, averaging 5 shillings, so that the total expenditure was 1,250,000 pounds.

⁵ Hanway, *op. cit.*, pp. 30-31.

⁶ *Ibid.*, p. 33.

⁷ *Ibid.*, p. 48.

⁸ *Ibid.*, p. 74.

⁹ *Ibid.*, p. 77.

¹⁰ *Ibid.*, p. 110.

and, with the American Institute of the History of Pharmacy and the important collections of books it recently purchased, it may develop into a great center of studies in the field.

Yale University has the equipment for a first-rate institute with the rich collections of Harvey Cushing, Arnold C. Klebs, John F. Fulton, E. C. Streeter, and some others, and there is no doubt that a chair will be created some day soon. Very good collections are available in a number of other universities—Kansas, Stanford, California—and in New York, Boston, Philadelphia, Washington, such splendid collections of medical history are available that universities desirous of founding a department of medical history would not have to spend their funds purchasing rare old books but could use them for a staff and for basic reference books.

It seems important to me that in making plans for the future one should avoid creating departments merely on paper. A department or institute of the history of medicine is one in fact only if it has a budget and a staff, and the professor and his associates should have adequate salaries so that they would not have to make a living in some other occupation. Not every medical school can afford a department at the moment, but some should be developed in various sections of the country, particularly where resources in books and other materials are already available.

There is today a very strong and very genuine interest in the history of science. Recent events have stirred up many people and made them wish to see science in the proper perspective and with its social implications. President Conant's Terry Lectures, moreover, pointed to the historical presentation as one that was highly suitable to give college students an understanding of science.¹⁹ In the last few months I had inquiries from at least half a dozen colleges which were looking for scientists who could teach the history of science. New chairs have been created not only at Wisconsin. Cornell University enriched its Department of History by appointing a brilliant young man, Henry Guerlac, as professor of the history of science.

The history of medicine and the history of science, different as they are, have so much of their past in common and use the same tools to such an extent that departments could easily be combined wherever the medical school is not too distant from its mother university.

Another very significant development was that general historians became increasingly interested in the history of medicine and science. Richard Shryock and his school at the University of Pennsylvania have

¹⁹ James B. Conant, *On Understanding Science*, New Haven, 1947.

we annually send to Canton."¹⁴ The tea trade also brought in a revenue of about 350,000 pounds annually "which, as a tax on luxury, may be considered of great utility to the state." But then, Hanway argued, one seventy gun ship of war would breed as many seamen as the whole China trade. And as to the loss of revenue, it could be compensated easily by importing less iron from Sweden, imposing a tax on gold and silver lace, embroidery, or other gold or silver manufactory (lords and gentlemen belonging to the king's household, and to the army and navy excepted), or by taxes on jewels, on wigs, on playing cards, coaches, and servants.¹⁵

The reader is invited to stop for a moment and to look at the frontispiece to Hanway's book, where the artist has depicted conditions that cannot but move us to tears. A ship has arrived from Canton. Boxes are being unloaded, and from the Chinese characters we can easily guess what their pernicious content must be. Three people carrying bags full of gold and silver are walking to the shore to exchange England's wealth for Chinese poison. A family, an English family, is in the foreground—sipping tea, forgetful of the world around them. The child playing with the fire has upset the teakettle and is being burned. What do they care? They sip their tea. One of them is already in rags, and to the left we see a house in ruins: England's future, the result of the pernicious habit of tea drinking. *O tempora, o mores.*

What is the remedy? If we must retain our porcelain cups and our sipping, then let us drink infusions made from native herbs such as ground ivy, balm, lavender, thyme, mint, rosemary, pennyroyal, horehound, trefoil, sorrel, angelica, cowslip, and sage.¹⁶ They are harmless and are more delicious to an undebauched taste than the choicest tea. Or let us present glasses of sugared water, or milk and water and similar refreshments, which can be procured without going so far as China.

The wild infatuation of drinking tea took its rise from example. By example it is supported, and example only can abolish the use of it. The suppression of this dangerous custom depends entirely on the example of the ladies of rank of this country. Should they give it and thus destroy the many-headed monster, Hanway would employ all his interest to have a statue erected to their memory,

not of gold or silver, for I fancy we shall want these metals for other purposes, but of brass or marble, which will last as long. It shall be inscribed:

¹⁴ *Ibid.*, p. 184.

¹⁵ *Ibid.*, p. 238 ff.

¹⁶ *Ibid.*, p. 225 ff.

UNIVERSITY EDUCATION

MR. Chairman of the Council, Mr. Principal, ladies and gentlemen:

I am deeply moved, and I wish to express my profound gratitude for the great honor bestowed upon me by the University of the Witwatersrand. Sometimes I feel that honorary degrees are somewhat like arteriosclerosis, a symptom of the beginning of old age. You have worked assiduously for a long time. You are getting on in years. Your arteries begin to harden and your work to be recognized. But then, of course, there is a great difference, in that arteriosclerosis is a most unpleasant symptom—of which I have been spared so far—while the recognition of a man's work is the strongest encouragement he can possibly find and the most powerful incentive to pursue in his endeavors. And for an academic teacher there is no higher distinction than to be admitted among the honorary graduates of a university.

In honoring me you have at the same time expressed your appreciation of the field of research to which I have devoted my life's work. And since it is unusual for a physician to study the history and sociology of medicine, let me tell you how I became interested in the subject and let me pay tribute to the memory of some great teachers it was my good fortune to have. If I have been able to make a contribution to my field of studies—modest as it may be—it was due to hard work, without which nothing is

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An address delivered at Selborne Hall in Johannesburg [South Africa] on November 15, 1939, on the occasion of the conference of the degree of Doctor of Literature *honoris causa* by the University of the Witwatersrand.

of us are inclined to think on whom beauty has ceased to smile; but our fathers and grandfathers made the same complaint before us, and our posterity will still find beauties irresistibly powerful." Granted that nervous diseases are more frequent than in the past,

but this new race of evils, will not be expelled by the prohibition of tea. This general languor is the effect of general luxury, of general idleness. If it be most to be found among tea drinkers, the reason is, that tea is one of the stated amusements of the idle and luxurious. The whole mode of life is changed, every kind of voluntary labour, every exercise that strengthened the nerves, and hardened the muscles, is fallen into disuse. The inhabitants are crowded together in populous cities, so that no occasion of life requires much motion; every one is near to all that he wants; and the rich and delicate seldom pass from one street to another, but in carriages of pleasure. Yet we eat and drink, or strive to eat and drink like the hunters and huntresses, the farmers and the housewives of the former generation, and they that pass ten hours in bed, and eight at cards, and the greater part of the other six at the table, are taught to impute to tea, all the diseases which a life unnatural in all its parts, may chance to bring upon them.

Tea, moreover, is as a rule not consumed in enormous quantities. Few people drink more than three cups, and it is the tea table rather than the tea itself that brings them together.

The proper use of tea is "to amuse the idle, and relax the studious, and dilute the full meals of those who cannot use exercise, and will not use abstinence." There is no doubt that time is lost in this entertainment, but this should not affect the national economy "because I know not that any work remains undone for want of hands. Our manufactures seem to be limited, not by the possibility of work, but by the possibility of sale." Tea, however, is not a proper drink for the lower classes "as it supplies no strength to labour, or relief to disease, but gratifies the taste without nourishing the body."

Johnson for once agrees with Hanway, namely in the point that the employment of five to six hundred sailors should not be an argument in favor of the tea trade because, he adds, "I am told, that sometimes half, commonly a third part perish in the voyage," so that the country loses annually two hundred men in the prime of life and "we . . . reckon, that the trade to China has destroyed ten thousand men since the beginning of this century."

Johnson's conclusion is: "If tea be thus pernicious, if it impoverishes our country, if it raises temptation, and gives opportunity to illicit commerce, which I have always looked on as one of the strongest evidences of the inefficacy of our law, the weakness of our government, and the cor-

through the course, and we had a choice between English and Italian. In addition we had excellent instruction in science, which proves that it is quite possible to combine science with humanistic studies.

Among the many teachers I had during that period one stands out far above all the others: our professor of history, Otto Markwart. He was not a detached but a passionate historian, violent in his sympathies and antipathies. He worshipped Mozart and loathed Wagner. A student of Jakob Burckhardt, he was a humanist, deeply attached to Italy where he spent his vacation every year, returning with piles of photographs that he passed around in the classes. An enthusiastic teacher, he could electrify the students. Discussing a stormy session of the Roman Senate, he jumped up, addressing the class: "You are the Roman Senate. What are you going to do? You have defeated Carthage but again she raises her head threateningly. You there in the corner are Cato. Get up and tell them what they shall do!" And the boy, Cato himself, addressed the senate passionately, ending his harangue with the ominous "*Ceterum censeo. . .*"

From Markwart I learned what history is—not a dead subject but a living force that determines our life. He taught us to think in terms of historic forces and developments. And in his broad approach to history that embraced all aspects of civilization he passed on to us boys the teachings of his master Jakob Burckhardt, whose classical books we devoured.

The old *Gymnasium* in Zurich was a great school to which I owe infinitely more than I was aware at the time. It had a great tradition of liberalism, and all philosophies were represented among the faculty. It taught us how to organize our work and succeeded in challenging us and arousing our intellectual curiosity so that we could spend whole nights discussing Plato, Kant, Darwin, Haeckel, or Marx, and sometimes almost came to fist fights over problems of Russian literature or modern art. When we graduated at the age of eighteen or nineteen we were well prepared for the university.

During my *Gymnasium* days I became interested in the East, and since the language is the key to the understanding of every civilization I began learning Arabic. For a number of years I spent an early hour on the study of Arabic every morning before going to school. I then took the Hebrew courses that were offered at the *Gymnasium* to those students who intended to study theology. After graduation I registered in the Philosophical Faculty of the University of Zurich as a student of oriental philology. I continued my studies of Arabic and Hebrew and took up Sanskrit. And since the latter course proceeded rather slowly I worked with a private

When he [Hanway] treats of Tea in his assumed medical capacity, he speaks by no means like an adept in physic: indeed it is not to be expected, that every Gentleman can be acquainted with a science that requires so much time and industry in the acquisition, and therefore we may forgive his errors without pointing them out: but if to be unacquainted with the medical art, indicates no want of general knowledge, yet, perhaps, it argues some want of prudence, to speak of subjects to which our acquirements are not adequate.

Yet after all, why so violent an out-cry against this devoted article of modern luxury? Every nation that is rich hath had, and will have, its favourite luxuries. Abridge the people in one, they generally run into another; and the Reader may judge which will be most conducive to either mental or bodily health: the watery beverage of a modern fine Lady, or the strong beer, and stronger waters of her great-grandmother?

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While I am writing this paper—sipping many cups of fragrant Hu-Kwa and Souchong—I cannot help feeling uneasy. I want to be detached and impartial, but I cannot conceal to myself that I thoroughly dislike Hanway. Not because in this particular controversy I happen to be on Dr. Johnson's side, but because I have a profound aversion to the type of philanthropist that Hanway represents.

There cannot be the slightest doubt that men like Hanway were honest and sincere, and that they did a great deal of good. Living in a harsh society in which birth and wealth gave all privileges and the common man had little chance of escaping his servitude, they succeeded in improving outrageous conditions, in mitigating the hard lot of thousands of people, and in saving many human lives. Is this not enough? Why can we not admire these men without reservation? I think there are various reasons.

One is that the self-righteousness of many of them is hard to bear—their holier-than-thou attitude, their constant moralizing, which makes their writings so intolerable. Much more serious is that they never attempted to attack the social evils at their root. They accepted the system under which they lived with all its injustices. They took it for granted that the rich was rich and the poor poor, and that it was the poor man's duty to serve the rich and to increase his wealth. They built foundling asylums and improved the lot of the infant parish poor and knew that this would provide sailors for the navy and domestic servants for the rich. They accepted it as an axiom that the East India Company had to earn dividends for their stockholders and excused them if, by so doing, they

At the end of the course he apologized for having covered so little ground but added that we could easily find the rest in books, and that if we had followed him we would be able to consult and use books intelligently. I never had an opportunity to talk to Professor Lang. He did not know of my existence. I was just one of hundreds of students who crowded his lecture hall. But I was tremendously influenced by him because I had the privilege of watching the working of his mind. And from him I learned how to teach. Much later, when I became an academic teacher myself, I remembered how he had presented his subject, built up his lectures, and organized his courses. The European university has a great tradition of academic oratory, an art that is not taught in courses but passed on from master to student through example and by the mere force of personality.

My year in science was a happy one and for a while I considered remaining in science, but again the phantom of specialization arose. What was it to be: chemistry or zoology or botany? Medicine seemed the broadest field, and so I became a medical student and never regretted it. Medicine undoubtedly is one of the most fascinating academic subjects in that it leads the student through heights and depths of human life.

I studied medicine at the University of Zurich, where I graduated in 1917, and at the University of Munich, where I spent the summer of 1914. I had many excellent teachers during the six years of my medical course, but two of them stand out far above all others: Friedrich von Müller and Ferdinand Sauerbruch. They were very different but great teachers both.

Friedrich von Müller was at the height of his career when I took his course. He was Professor of Clinical Medicine in Munich, a dignified personality and a great physician and scientist with vast cultural background. He represented the best type of German professor. His task was to introduce the young student into the field of clinical medicine. Every morning he gave a clinic of two hours at which he presented one typical case. Four students were called upon, and with them he examined the patient and discussed the case, while the others watched them with breathless attention. His presentation invariably began with the question: "What do you see, what strikes you when you look at the patient?" whereby he meant to develop our faculty of observation. He repeated over and over again that medicine was not difficult provided we had a thorough foundation in anatomy, physiology, and general pathology. "You must know the structure of the human body, its function and the

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later, in Germany, he helped me in my career whenever he had an opportunity. Sauerbruch's teachings and personality had a profound influence upon my own development, and I shall remain attached to him all my life.

I was an enthusiastic medical student, but I obviously remained interested in the humanities. In Zurich, medical school and university were on the same campus so that it was possible for medical students to attend courses in the academic division, which I frequently did. In Munich, once in the middle of the academic year I suddenly felt tired of the hospital and of medicine at large. I began skipping classes and spent the days in museums and art galleries, the nights in theatres and concert halls. I was in a turmoil, and when quite accidentally I met a friend in the street who was leaving the same day for Venice I decided to join him and spent several weeks in Italy. For a while, medicine was entirely forgotten and I lived in a world of history and art. Then, one evening, sitting in a café of the Piazza San Marco I felt an irresistible longing for the hospital, and there for the first time it occurred to me that medical history and the history of science might be a field in which I could combine all my interests. I went back to Munich the same night in a state of great elation. The next morning I resumed my hospital work with enthusiasm. In the afternoon I went to the library where I found *Isis*, the journal recently launched by George Sarton, and the various publications of Karl Sudhoff. In the next few days I made a plan to study the various periods of the history of medicine and science by reading the most important texts. A German publisher was issuing a series of historical source books that included the history of science, and I soon was collecting materials for a history of oxidation. But then the war broke out. We were all called for practical work, and the book was never finished.

Here I must recall one school that taught me probably just as much as the university, although I was not fully aware of it at the time: the army. I served for nearly two years in the Medical Corps of the Swiss Army. In Switzerland every citizen is trained to be a soldier, and medical students are automatically enlisted in the Medical Corps at the age of twenty, where they are promoted to higher rank according to their professional status and length of service. At the outbreak of the World War, the entire army was mobilized and kept under arms for the first eight months. After that time, when it became apparent that the country was not immediately threatened, only one half of the army was kept at the borders, so that throughout the war we medical men spent half of the

Sixteen years ago I discussed before this club the work of the Leipzig Institute, which had been founded in 1905 by Karl Sudhoff and to which I had been called in 1925. Today on the eve of returning to Europe I would like to talk about the Johns Hopkins Institute of the History of Medicine. I do not, however, wish to discuss it separately but rather as one link in the development of studies in medical history in this country.

This development, as a matter of fact, went very much along the same lines as in Europe. Until the nineteenth century, medical history on both continents was an integral part of medicine. The approach to the past was not a critical historical one but was taken from a medical point of view. Books were read for their factual content, irrespective of the period at which they had been written. Doctors read them in order to learn how to treat their patients, and they thought that they could gain practical knowledge from Hippocrates as well as from Sydenham. The medical apprentice in America, browsing in the library of his teacher, found Hippocratic treatises in Latin or English translation, and the modern books he read, the works of Sydenham, Boerhaave, later the physiology of Haller and the works of Brown and Cullen, were full of historical references. When the medical school of the University of Pennsylvania was founded in 1765, it had no need for a special chair of medical history because all members of the early faculty, Rush, Morgan, Shippen, Kuhn, were well versed in the subject, and in their lectures and writings constantly referred to the past of medicine as a matter of course.

So far as I can see, the first man who might be considered a professor of the history of medicine in America was Robley Dunglison, who was called to the University of Virginia in 1825. Thomas Jefferson, then Rector of the university, insisted that he should teach to the best of his ability and with due diligence the history of the progress and theories of medicine. But since the terms of his appointment foresaw that he should in addition teach anatomy, surgery, physiology, *materia medica*, and pharmacy, we can hardly consider him a full-time professor of medical history. His lecture notes were published by his son in 1872 and became a well-liked textbook on the subject.

I will not dwell upon this early period, will not discuss the biographies and biographic dictionaries written at the time, the historical orations that seemed to have been very popular for a while, nor the place taken by historical considerations in medical literature in general. Miss Genevieve Miller plans to investigate this period some day and will, I am sure, bring forth many interesting facts. I rather wish to take you now to the last

was twenty-seven years old. I had an all-round medical training and had acquired some practical experience in medicine and public health. During the interval between two service periods I had interned for a while in obstetrics, and in my senior medical year I had done experimental research in the Pharmacological Institute of the University of Zurich under Professor Cloetta, as the result of which I had published my inaugural dissertation under the title "Experimental Investigations on the Effect of Chronic Camphor Medication on the Normal and Sick Heart." And now the question arose what the next step would be?

I knew what I wanted and felt no hesitation about it. My field of research was to be medical history. To most of my former professors I was a lost sheep. "Medical history," they said, "is a delightful hobby for retired practitioners but there is no career in it." I was no longer a child and knew better. And this time I was right. In all my previous studies I had felt the need for an historical approach to any given problem. I saw that general history must by necessity remain fragmentary and lead to wrong interpretations if it does not include the history of science. And I felt, although rather vaguely at the time, that medical history studied in a broader sense could be developed into a method that could contribute to the solution of urgent social problems of medicine. In medical history I found a field that was not a narrow specialty and in which I could combine my various interests. I was fully aware that I was not yet equipped for such studies and that I would have to go back to school for at least three years. And since I could no longer afford to make a wrong start I went to Leipzig in 1919, as soon as conditions permitted, in order to consult and work with Karl Sudhoff.

The Institute of the History of Medicine founded in 1905 at the University of Leipzig was at the time the undisputed center of research in medical history. The institute was Karl Sudhoff. He filled it with his powerful personality. It was his workshop that he had built up. He had no associates and no secretary and was only aided by an "Institutsdiener," who served him devotedly and kept the place in order. But he had a large group of students who wrote their inaugural dissertations under his guidance and published for him the texts in which he was interested. And every researcher in medical history from all over the world came to Leipzig to consult him and to use the resources of the institute.

He was an indefatigable worker. From 1905 on, when he abandoned general practice and accepted the chair in Leipzig, he published a large number of monographs, hundreds of papers, and edited half a dozen jour-

made the statement that "it is very rare that a man ignorant of the history and literature of his profession achieves great success."²

It was in the 1870's that he planned the *Index-Catalogue of the Surgeon General's Library* and the *Index Medicus* and thus made the greatest possible contribution to the history and bibliography of medicine. When the school of medicine was opened in 1893 he was appointed Lecturer in the History and Literature of Medicine and gave courses until 1904.

The Johns Hopkins Medical History Club, or rather The Johns Hopkins Hospital Historical Club, as it was named at the time of its foundation, met regularly from 1890 until 1905 either in the library of the hospital or in the homes of the members, and Eugene Cordell of the University of Maryland did not exaggerate when he made the statement that the club had "exercised a profound influence not only locally but throughout the entire country. Many able papers have been read before it, and there are few who have any claims to distinction in this field in the United States who have not been its guests." This was very true, and we find the medicohistorical activities of the entire country reflected in some way or other in the papers read before the club, many of which were published in the *Bulletin of the Johns Hopkins Hospital*. Many of these papers deserve to be reprinted today, and I am sure that they would make a very attractive volume. I also wish that someone would write the history of the club, because I consider it extremely significant that the school which at that time made the greatest effort to develop the scientific foundations of American medicine was the one which from the very beginning emphasized the humanistic approach to medicine. This did not happen by accident but was the reflection of a certain mental attitude about which we would like to know more, and a historical study would provide an analysis from which we could learn a great deal.

When Osler left Baltimore in 1905, the club interrupted its activities for a while but resumed them later, and, as you know, it is flourishing today. Similar clubs were founded in the course of time in other universities and communities, and a survey made in 1937 revealed the rather astonishing fact that at that time thirty-eight local medical history groups were functioning in the United States and seven in Canada.³ The coun-

² See Sanford V. Larkey, "John Shaw Billings and the History of Medicine," *Bulletin of the Institute of the History of Medicine* 6:360, 1938.

³ See H. E. Sigerist, "Medical History in the Medical Schools of the United States," *Bulletin of the History of Medicine* 7:627-662, 1939, and "Medical History in the Medical Schools of Canada," *ibid.* 8:303-308, 1940. The Canadian survey was made in 1939.

established in the field. It set a high standard of scholarship and served as an example that was soon to be followed by other universities in Germany and abroad. It was my good fortune that I could begin my career in such an institute and with such a teacher. It gave me a solid philological foundation without which serious studies are just as impossible in medical history as in any other historical discipline.

In 1921, at the age of thirty, I felt sufficiently prepared to apply for an academic position. I was appointed *Privatdozent* at the University of Zurich, where I had a small but devoted group of students. When Sudhoff retired in 1925, his chair and the directorship of the Leipzig Institute were offered to me. It was not an easy job to be the successor of such a great man. I realized that the task was not to imitate my predecessor but to preserve the high standard of the institute while developing it along my own lines. Sudhoff was primarily interested in the philological side of medical history in texts and documents that he published by the hundreds. I had become increasingly interested in the sociological approach to history and in the sociology of medicine. I saw that the application of medical knowledge to society was made so difficult by a variety of social, economic, political, religious, and philosophic factors that had to be investigated if progress was to be achieved. Without neglecting philological studies I endeavored to develop the institute more and more along the sociological line. My book *Man and Medicine* written in those years reflects this attitude.

It was in 1927 that I first came in touch with William H. Welch. He had done more for the development of scientific medicine in America than anybody else, and now, nearing the end of his career, he intended to establish at the Johns Hopkins University in Baltimore, with which he had been connected since 1884, an institute of the history of medicine similar to that in Leipzig. He was traveling in Europe, purchasing books for the new institute, and came to Leipzig to discuss his plans with Karl Sudhoff. I was in touch with Dr. Welch from 1927 to the time of his death in 1934, and although I cannot claim him as one of my teachers I learned a great deal from him, as everybody did who had the good fortune to be close to him. As a matter of fact, I wished I had learned more from him, particularly his unaggressive way of attaining an end by diplomatic means. Temperaments, however, are different.

The Johns Hopkins Institute was opened in 1929. Sudhoff went to America for the occasion. Two years later, in 1931, I was invited as a visiting lecturer. I spent two months at the institute, whereupon I went on a

Howard A. Kelly and William S. Halsted were also keen collectors, whose books are now the prized possession of the William H. Welch Medical Library. A Baltimore friend of Osler was Dr. Henry Barton Jacobs, who devoted a lifetime to the collecting of books and documents on the history of vaccination and of tuberculosis, on Rabelais, Laënnec, and Pasteur. Housed in an especially designed room in the Welch library, the collection has rendered great services to the Institute of the History of Medicine and has been widely used in research, teaching, and in the preparation of exhibits. A four volume catalogue is in preparation, each volume of which is intended to be a basic reference book of its field. At Hopkins Harvey Cushing became interested in old medical books, and today his unique collection, particularly rich in Vesaliana and other Renaissance literature, is the backbone of the Historical Library of the Yale School of Medicine and, together with the collections of John F. Fulton and Arnold C. Klebs, the nucleus of what may develop into a very important institute.

I have mentioned only a few collectors who on account of their Hopkins connection are particularly close to our heart, but at the same time all over the country doctors with love and enthusiasm were purchasing old medical books, building up collections which ultimately found their way into a library and thus became available to students in the field. An interesting study could be written on medical book collecting in this country. What seems particularly important to me is that students should know where collections are located and what they contain. The Army Medical Library has its *Index-Catalogue*, and catalogues have been published of other outstanding collections, many of which have been included in the Union Catalogue of the Library of Congress. It is the smaller collections that frequently escape the attention of scholars. Thus the student of Paracelsus must know that we are fortunate in having two valuable collections of Paracelsiana in the country, the Constantine Hering Collection in the Library of Hahnemann Medical College in Philadelphia and the Robert E. Schlueter Collection in the Library of the St. Louis Medical Society. The student of balneology will find a collection of books on the subject at Saratoga Springs, and in a similar way we have many collections scattered all over the country that may not necessarily be large but may be most useful. *The Bulletin of the History of Medicine* published a series of articles under the general heading "Medical History Collections in the United States and Canada" giving either descriptions or check lists of just such collections. I hope that this will be continued

selves. I made endless mistakes, but I learned through them and found my own way.

I have a particular grudge against textbooks, the only literature ever consulted by many students. Instead of reading Plato or Newton the student reads about them and thinks that he knows them if he is able to repeat a few judgments read in a book. The textbooks present a subject carefully digested and in a simplified way. They read without effort and are forgotten over night. Do not misunderstand me. There are excellent textbooks, and when used judiciously they have an important function to fulfill. They allow a rapid orientation over a wide field. But they can never replace the study of original texts.

When a publisher wishes to recommend a book, he advertises it as being "highly readable." He may even add that it is written in a "delightfully informal way." And when a reviewer wants to praise a book very highly he emphasizes its readability, by which he means that every fool can read it without effort. And yet we all know that the books that contribute most to the formation of our minds, the books that have made history, are anything but "highly readable." They are books with which we struggle, that we read and reread with pencil in hand, books that we have to conquer page by page. But once we have conquered them we possess them. Many subjects are difficult by nature, and a presentation ceases to be true when it is oversimplified. No knowledge can be obtained without labor, and we should not be afraid to require great efforts from our students.

The gown that we are wearing tonight is a medieval costume, and this reminds us that the Western university has a long tradition and a great past. From the medieval university we have inherited many external forms, such as the organization in faculties, examinations, degrees, and also the main forms of teaching: *lectio* and *disputatio*.

In the *lectio*, the medieval professor read and interpreted a book and the students wrote down what they heard. Books were rare and expensive in those days, and the books the students wrote during the courses became the main body of their libraries. Conditions have changed since then. Printing has made books easily available and has reduced their price considerably. The function of the lecture, therefore, no longer is to dictate books. The student can buy them for little money. The lecture must give what the student will not so easily find in books, namely, the living personal contact between man and man. In the lecture the professor, an expert in his field, thinks aloud and develops his own views

be required in addition to the lectures, which should be not less than sixteen to twenty in number. It should be made a subject of examination, for all experience proves that in no other way can the attendance of the students be enforced. The time is near at hand when the standing of universities will be judged by their attitude to this branch, and when it will be assigned a front rank in the curriculum.

We are still far from having fulfilled Cordell's postulates, although progress has been achieved, as we shall see in a moment.

At that time the writing of medical history in America was primarily the work of amateurs. An amateur is a man who loves a subject, who engages in it as a labor of love. Far be it from me to minimize the great contributions that amateurs have made and, I am sure, will continue to make to medical history. A practicing physician, moreover, if he has the necessary basic preparation and enthusiasm, may come to master methods of historical and philological research and, while still engaged in practice, may become an outstanding expert. Numerous examples could be cited on the subject.

On the whole, however, it must be admitted that the field of research open to amateurs is limited, particularly today when very few young people come to medical school with classical training, and in spite of requirements very few have more than a superficial knowledge of any modern foreign language. This restricts their field of historical research primarily to local history.⁸ And yet so much remains to be done in the whole wide field of medical history, so much source material is still untapped, so many re-examinations and revaluations need to be made in medicine of antiquity, the Middle Ages in East and West, the far East, the Renaissance, and even in medicine of the last three hundred years. Strange as it sounds, we do not yet have an adequate monograph of such an important episode as the school of Salerno. Most of the texts are printed, but no one has attempted as yet to analyze and evaluate their medical content. No monograph has ever been written on such influential movements as those of the iatrochemists and iatrophysicists. In the field of Arabic medicine most elementary work, the cataloguing of medical manuscripts and the publication of basic texts never printed before, still remains to be done. And, as to classical antiquity, the *Corpus Medicorum Graecorum* and the *Corpus Medicorum Latinorum* are far from finished. An infinity of studies remains to be made on the history of dis-

⁸ On this subject see the illuminating articles of Genevieve Miller, "The Study of American Medical History," *Bulletin of the History of Medicine* 17:1-8, 1945, and of Whitfield J. Bell, Jr., "Suggestions for Research in the Local History of Medicine in the United States," *ibid.*, 460-476.

of knowledge, because there is no such thing. Science and the humanities evolve from day to day. If a student left the university with nothing more than the knowledge accepted in his year of graduation, he would soon be hopelessly behind. The university must do infinitely more than teach facts and theories. It must help the student to develop his faculties, must train him to think independently and critically, so that he may form his own judgments. It must teach him methods of study so as to enable him to keep pace with developments. It must open up horizons for him, lead him in attaining a correct sense of values, in developing his attitude toward life, in one word, his philosophy. The actual work must be done by the student himself. Nobody can do it for him. But the university helps him by giving him the privilege to live and work for a number of years in close touch with a group of men who have devoted their lives to the advancement of knowledge.

If academic instruction is to be fruitful it must be based upon research. Only men who have been actually engaged in research are competent to present a subject adequately. The student feels instinctively whether a professor is merely abstracting a textbook or whether he speaks with authority. We all have to teach subjects that we have not explored ourselves, but if we are researchers we are able to evaluate other people's results critically. I am well aware that it is often extremely difficult for a professor to continue his researches. Many are unduly burdened with teaching. The rapid development of our universities has created so many administrative tasks that time and energy of many departmental heads are entirely absorbed by them. And since the professors are experts they are called upon for advice by the state and other agencies. It is impossible to evade these tasks. Academic teachers should not live cloistered in their studies but keep in close touch with life, feeling the pulse of a society for which they are preparing young people. Departments must be administered. They are serving not only present needs but are building up collections and storing experience for the future. It is increasingly difficult to be professor and researcher at the same time, and a situation has arisen that may wreck the university if a solution is not found.

In spite of all difficulties the academic teacher must remain a researcher. It means incessant hard work, and many amenities of life must be sacrificed. But the compensations are endless.

There is another point to which I would like to draw your attention. The medieval university was the *universitas litterarum*. It emphasized the universality and unity of learning. It is true that it also trained young

extensive collections were being consolidated and an enormous amount of administrative work had to be done.⁹

I soon realized that I would have to bring some staff members over from Europe. Dr. Owsei Temkin came with me in 1932. He had been my associate and *Privatdozent* at the University of Leipzig and continued to be my senior associate in Baltimore. He is one of the few men whose enthusiasm for medical history was such that he entered the field in his student days and never left it. As a young student he read a seminar paper which was so good and so original that I immediately published it, and I have quoted it many times since then.¹⁰ His doctoral dissertation was an important contribution to the problems raised by the *Corpus Hippocraticum*.¹¹ After having completed his internship in medicine, he joined my staff in Leipzig, and wherever he felt a gap in his philological equipment, whether it was in Arabic or Assyrian, he took courses and filled the gap. He never sought cheap and quick success but took up large and difficult subjects such as archaic medicine—the term is his—the late Alexandrian school, the history of epilepsy, or problems of the relations between philosophy and medicine. There are few younger medical historians today who combine knowledge of medicine with such broad philological, historical, and philosophical experience. To the institute a man of such caliber was indeed most valuable.

Since Greek medicine was the foundation of western as well as of Arabic medicine, an institute like ours was bound to place strong emphasis on classical studies and we needed a man to direct them. He was found in Dr. Ludwig Edelstein, who came from the University of Berlin and, young as he was, who had acquired considerable reputation through a highly original book on the Hippocratic writings.¹² He joined the staff in 1934 and until his departure in 1947 made the institute a very active center of study and instruction in classical medicine. It was his excellent idea to steer young classical philologists into the field of ancient science through a program of fellowships, as a result of which two Carnegie Fel-

⁹ I am most grateful to Dr. Garrison for the help and advice he gave me in the preparation of my book on *American Medicine*, Leipzig, 1933, New York, 1934.

¹⁰ "Zur Geschichte von 'Moral und Syphilis,'" *Archiv für Geschichte der Medizin* 19:331-348, 1927.

¹¹ "Der systematische Zusammenhang im *Corpus Hippocraticum*," *Kyklos* 1:9-43, 1928.

¹² "Περὶ ἀέρων und die Sammlung der Hippokratischen Schriften," *Problemata, Forschungen zur klassischen Philologie*, no. 4, Berlin, 1931. About Dr. Edelstein and his work see this bulletin [*Bulletin of the Institute of the History of Medicine*], 2:200, 1934; [*Bulletin of the History of Medicine*] 21:558, 1947.

going to be, he should be familiar with its history, its sociology, its philosophy. This will by necessity broaden his outlook and increase his usefulness.

We must try to overbridge the gap between the old humanities and the new science, between the social and the natural sciences. If the old humanities include studies in ancient science, they will not die but remain eternally young, a source of inspiration and happiness for generations to come. If history includes the history of science, it will become a still more powerful weapon in the shaping of the future. If economics and sociology get closer to the natural sciences and adopt more of their methods, they will greatly benefit by it. And, if we succeed in bringing the humanities and the social sciences into the natural sciences, we shall be able to develop a scientist who will be more than a narrow specialist, who will be aware of the place of science in the world and of its function in society. Nothing could be more encouraging than to see that already there are great scientists, great specialists in their respective fields, men like J. B. S. Haldane, J. Needham, H. Levy in England, J. Langevin in France who, without neglecting their laboratories, are fully conscious of the burning problems of our time and are taking an active part in their solution.

My own work as an academic teacher is devoted to the task of preparing physicians who will be aware of the historical moment in which they live, aware of their great social responsibilities and of the economic necessities of medicine, so that they will be equipped to take an active and intelligent part in the life of society and in the developing of a system of medical services that will reach everybody, whether rich or poor, whether white or black.

§

Ladies and gentlemen: Once more I wish to express my profound gratitude for the great honor bestowed upon me by this university. I appreciate it more than I can tell, not only because it shows me that you did not regret having invited me to South Africa as a visiting lecturer, but because it connects me permanently with a university for which I have a great admiration and to which I have become deeply attached.

It was my privilege to meet many members of your faculty and many of your students, and I was greatly impressed by their progressive attitude and liberal outlook. I have no doubt that the young men and women

who joined the institute first as a student, then as my research secretary, and finally as a member of the staff. Her books and papers are well known, her courses were much appreciated by students of all classes, and as a skillful editor of this bulletin she rendered invaluable services to the institute as well as to the American Association of the History of Medicine.

I always felt that an institute of our type should cover the whole world, and I once had plans for creating branch institutes in China and India, countries where you can study ancient and medieval medicine in the field. I soon realized, however, that such plans could never be put into practice, but we did study the history of Chinese medicine. Dr. Edward H. Hume joined our group as Lecturer in the History of Medicine in 1938. He brought to us his rich knowledge and the experience of a lifetime in Chinese language and Chinese medicine and gave every year very interesting seminars. We also were fortunate in having a graduate student, Ilza Veith, who made the first translation into any Western language of the *Huang Ti Nei Ching Su Wen*, one of the earliest classics of Chinese medicine.

We had a good staff for many years, highly diversified. Put together we could handle texts in at least sixteen languages. People often came to offer their services as translators, but not once did anybody come who knew a language that one of us did not know also.

What is the task of an institute? Why do we need them? Why is it not enough to appoint scholars and let them work wherever they please? First of all there is the very important question of continuity. A scholar dies or retires, and his work ceases. But where there is an organized department a successor must be appointed, and the work is carried on. Thus an institute is a collection of specialized tools, books, manuscript and printed, autographs, documents, portraits, pictures, medals, slides, objects, tools for research and instruction, which must be kept together and improved constantly. With every year that passes an institute becomes a better tool. But just as the best violin is dead unless there is somebody to play it, an institute is lifeless unless there is a group of men to use the tools. They may differ a great deal as individuals, but they are united by a common ideal of scholarship and are working together towards a common goal.

Collections are very important, but they are instruments, not ends. The primary purpose of a university department is the advancement of knowledge through research and the instruction of students.

LIVING UNDER THE SHADOW

PHYSICIANS, as a rule, are poor patients; they know too much and therefore never fully accept the guidance of a doctor as other sick people do. They are unable to approach their own case objectively; they are necessarily biased, and it is more difficult for them to adjust to a disease condition. If they do succeed, they may have a lesson to teach. I have three incurable chronic diseases, but I am still able to work with great pleasure from nine o'clock in the morning to midnight and I enjoy life perhaps more acutely now than ever before.

It was a new experience to me when, during the last war, I gradually had to take illness into account and had to figure with it when organizing my daily life and planning for the future. I had enjoyed the best of health for the greater part of my life and had found the body always responsive to the many demands of an active mind. Only once had I been seriously ill, when I was stricken with pneumonia which developed into an empyema.

I was operated on; a thoracotomy was performed, an operation that was well known to the Hippocratic doctors. Locating the pus accurately is no problem to us with percussion, X-rays, and exploratory puncture, but the Greeks also found the pus without the aid of our diagnostic methods. They knew the pus would ultimately break through and that the body would thus discharge the *materia peccans*, the faulty matter. But they also knew that this process might take a very long time—so long that the patient might succumb or at any rate be greatly weakened. Hence it was

able whom I would have preferred to see in the academic atmosphere rather than in government offices. But it was impossible to find the money, not only on account of the depression but chiefly because the subject was one that might easily yield controversial results.

Although we could not create a special division for the sociology and economics of medicine, the subject was not entirely neglected at the institute because I was vitally interested in it. Several of my books and numerous papers were devoted to it, and as early as 1933 at the request of our Dean I began to give courses in it.

This brings me to the teaching program of the institute, one to which we devoted much time and much thought. I shall be very brief about it because I have discussed it at some length in a previous paper.¹⁶ When I joined the university, Dr. Welch had retired and instruction consisted of a few lectures and conferences given by the members of the very small staff then existing, so that we practically had to begin from scratch. We experimented a great deal, and I am glad to say that to the present day we never stopped experimenting. The goal was to bring the social sciences and humanities into the medical school. We did it by teaching the history and sociology of medicine on various levels. For many years the department gave an introductory course to premedical students in the College of Arts and Sciences, until the authorities of the college ceased to be interested in it. A lecture course on general medical history was given every year to the entering class of the medical students, which was supplemented by an annual course in the history of American medicine. We then gave a series of seminars on a variety of special historical subjects which were attended by groups of from six to twenty-five students.¹⁷ It was felt that, in a school that had an organized department of medical history, students who had a special interest in the field must be given an opportunity to enter more deeply into it. The courses in the sociology and economics of medicine were addressed primarily to advanced medical students and to students of the School of Hygiene. They were lecture or, more frequently, seminar courses, or sometimes an elementary lecture course was offered and at the same time an advanced seminar. For a number of years we were the only department in the university that was inter-

¹⁶ "The Social Sciences in the Medical School," in *The University at the Crossroads*, New York, 1946, p. 127 ff.

¹⁷ Some of these seminars ended up by having the students prepare an exhibit illustrating the subject they had studied. See this bulletin [*Bulletin of the Institute of the History of Medicine*], 1:193-236, 1933; 2:447-476, 1934; 3:639-696, 1935.

position granted the sick man we must be feverish. As soon as our temperature is higher than normal we are excused from all the many duties and obligations imposed upon us by society. Tortured by gastric ulcers, a man is still expected to attend to his regular work and is often considered a nuisance because he requires a special diet, while the slightest fever makes us an object of attention and loving care. A fever makes it apparent to all that we are sick; ulcers do not.

§

The years have gone by, and now at the age of sixty I find myself with three incurable diseases. One is a rare but not significant disease, a *parapsoriasis en plaques*. A textbook describes it very correctly as being characterized by "widely dispersed, well-demarcated, superficial, non-infiltrated, pink to tan patches covered with a fine adherent scale." They do not itch or present any other subjective symptom, do not attack the face or hands, are not contagious; they come and go, disappear at times entirely, particularly during the summer months, come back and are more strongly marked in winter.

Nothing is known about the disease, and there is no cure for it. It is possible to get rid of the patches temporarily with chrysarobin or, under certain conditions, with large doses of vitamin D, but they come back after a short while and the best one can do is to forget about the disease and ignore it completely. This is very easy at my age, but, for young people who like to display their anatomy on beaches and are engaged in courtship, such a disease, harmless as it is, could be most unpleasant, particularly as the prejudice against all skin affections is still very strong. It also reminds us that in spite of great progress achieved we still have many unsolved problems in medicine, and it makes me feel very strongly how unsatisfactory our theory of disease actually is. Is *parapsoriasis en plaques* more than a name? Is it really a clinical entity, a disease in its own right? Or is it merely a symptom in a larger complex, symptom of a basic pathological condition such as an allergy?

This leads me to the second disease which I have had for many years now and which has caused me more discomfort than the one just mentioned, a chronic rhinitis. It developed slowly and gradually after I had come from Europe to America. I noticed that very many Europeans develop diseases of the upper respiratory tract in America, particularly sinus troubles. The violent climate with its sudden changes of tempera-

the subject had grown considerably in this country in the course of one generation. Forty-one schools, moreover, reported that they had library facilities for research in the field.

The American Association of the History of Medicine has grown from year to year, and, although its membership is not very large considering the enormous number of physicians and other medical personnel in the country, it is flourishing and active, has annual meetings with very stimulating programs, and has become a truly national organization which includes all individuals active or interested in medical history, and it also acts as a federation of local societies. It is ruled most democratically by a council which consists of the delegates of the constituent societies and elected officers. It is easy to foresee that the association will exert a growing influence in the country.

I have often been asked two questions that seemed embarrassing but actually were very easy to answer. Why did I not train more young people as medical historians? The answer was that, first of all, it was very difficult to find the right sort of young people, physicians trained in the humanities with an understanding of history. And, second, I could not encourage young people to devote many years of study to a field in which there were no openings. There were no paid positions outside of Baltimore at that time. And this leads to the second question.

Why was the example that the Johns Hopkins University set by creating such an institute not followed by other institutions? The answer to this question was also evident. The Institute was opened on October 18, 1929. Six days later the stock exchange collapsed in New York, and this marked the beginning of the great economic crisis which was to shake the world. The entire history of the institute so far has fallen into the years of depression, war, and postwar confusion. Whoever wants to appraise my work should keep this in mind. We had extraordinarily difficult years when we did not know how to carry on, and some very promising and timely projects could not even be considered for lack of funds. During those years, no other university could possibly have created a new department of the history of medicine.

Times have changed, and today we see the beginnings of an activity that may develop considerably in the years to come. The University of Wisconsin has created a full chair of the history of medicine, and it is a great satisfaction that one of our former co-workers, Erwin H. Ackerknecht, has been appointed to it. But the University of Wisconsin did more. It established two associate professorships of the history of science,

position granted the sick man we must be feverish. As soon as our temperature is higher than normal we are excused from all the many duties and obligations imposed upon us by society. Tortured by gastric ulcers, a man is still expected to attend to his regular work and is often considered a nuisance because he requires a special diet, while the slightest fever makes us an object of attention and loving care. A fever makes it apparent to all that we are sick; ulcers do not.

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acquired an international reputation, and a number of his students have made and are making important contributions to the subject. The late Carl L. Becker of Cornell in his splendid textbook, *Modern History, the Rise of a Democratic, Scientific and Industrialized Civilization* has shown that he was fully aware of the part played by science in the shaping of our modern world and has even expressed it in the title of his book. In the field of medieval medicine and science, the historian Lynn Thorndike and his school at Columbia University have published numerous texts, reference books, and studies of greatest value, and at the University of North Carolina Loren C. MacKinney is very active in the same field.

And so you see that we may look into the future with great confidence—and that I can afford to retire from the scene in order to devote my future efforts entirely to research and to the writing of a few books that I have been preparing for many years and that I could not possibly write in my present position.

Now that I have to say good-bye to you, I feel very sad because many of you have been infinitely more than students, have been real friends to me, but I know that the ocean cannot separate us and that we shall keep in close touch. I have been talking about medical history in the United States and I am going to live in a small village of Switzerland. But I will continue to feel as an American medical historian because I will continue to write in English and to publish my works in this country. And so I want you to think of me not as a foreigner but as an American scholar who happens to be working abroad.

I am leaving a good institute behind, one which still has great possibilities of development. A new and younger man will take over with new plans and new ideas, and this is as it should be. I am not going to quote Osler, but I really feel that no one should stay too long in the same position.

To the Johns Hopkins University, which has been very good to me and to which I have devoted fifteen of the best years of my life, I shall always remain deeply attached, and I shall never forget the Johns Hopkins Medical History Club.

men, industrialists in very responsible positions, are strongly advised to carry on with their work and not to resign; high officers of the general staff are kept in the army. They all have to make certain adjustments, to be sure, but every effort is made to impress upon them that they are not cripples, that they remain useful members of society, that hypertension is not a disease but a condition, an adaptation of the organism to certain pathological changes. As a very distinguished Swiss clinician said to me, it took a long time to persuade the general practitioner that he should measure the blood pressure as a matter of routine, but now he must be urged not to overrate his findings. Of course, in Europe as everywhere else, physicians and patients are well aware that the condition is serious, but there is no reason to become neurotic about it.

In my own case it is difficult to tell whether the condition began as an essential hypertension which gradually caused cardiovascular lesions or whether it was the result of slowly developing arteriosclerosis. I noticed that most American colleagues I consulted were extremely secretive. When they took the pressure and you asked them what they had read, they gave you a vague evasive answer which sounded either like a dark threat or like a light joke. I once spent two weeks for a general checkup at a famous hospital, had an endless number of tests made on me, and not only was I never allowed to see my case history but I also was never told what my blood pressure was, what the ophthalmological findings and the results of the various tests had been.

Of course I found ways and means of getting hold of the case history surreptitiously, and I suppose most physician-patients in such cases do, but I strongly resented the secrecy of my colleagues, which implied either that I had never heard of the fact that man is mortal, or that they considered me a highly neurotic individual who could not be told the truth, and this I am decidedly not. The result of this secrecy was that for a number of years I didn't consult a doctor until I found a very able young Viennese refugee physician who was absolutely frank and together with whom I made the necessary tests in his small laboratory.

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All this raises the very important question whether patients should be told the truth about their condition or not, a question which, I am sure, cannot simply be answered with "yes" or "no." Medieval ethics had no hesitation on the subject. The purpose of man's life was salvation, and

ever achieved, but also and to a large extent to the inspiration I received from great teachers.

I have to go far back to recall the figure of the first teacher who had a profound influence on the formation of my mind. When in 1901 my family moved from Paris to Zurich, in Switzerland, I was ten years old, and since I had a very imperfect knowledge of German I was sent not to a public but to a private school. It was owned and directed by an educator of genius, Fritz von Beust. Son of a German revolutionary who after 1848 had sought asylum in Zurich and opened a progressive school, he followed in the footsteps of his father. A strong man with a pink face and white beard, he was a convinced socialist and atheist and was first of all an enthusiastic scientist. Science played a dominating part in the curriculum. The rotation of the earth was demonstrated to the children by having them build a sundial in the garden and watching it through the seasons. We learned geometry by making cubes, cones, and other bodies. In geography we pasted maps on cardboard, dissected the various altitude layers with the jigsaw, and mounted them so as to construct relief maps of the country. And every few weeks we made whole-day excursions into the beautiful surroundings of Zurich. The geography of the region was discussed, but the chief purpose was to collect plants. Each one of us had a herbarium, and at the age of twelve we had learned to analyze the structure of plants and were able to diagnose the family of every one of them. A most liberal spirit pervaded the school. Teachers and students were carried away by von Beust's personality, whose mere presence was sufficient to ensure discipline. He opened up for me the realm of nature and awakened in me, as in so many others, a deep interest in science. It was only much later that I realized how much the three years spent in that school had influenced my whole outlook. After von Beust's death the school was continued for a few years by his co-workers, but the driving spirit was gone and the school closed down. It could afford to do so because in the meantime the public schools had adopted most of its principles.

In 1904 I became a student of the *Gymnasium* in Zurich. It was a public school preparing boys from all classes of society for academic studies. I was in the humanistic division, where for six and a half years we had eight hours of Latin and for five and a half years eight hours of Greek a week, so that at the end of the course most of us could read Latin and some of us also Greek fluently. In spite of the emphasis on the classics, modern languages were not neglected. French was a required subject all

to make a total extirpation of the womb, but when he opened the abdomen he found a very advanced tumor and metastases, so that nothing could be done. Biopsy confirmed the diagnosis. The woman was pensioned, went back home to her village, and *ut aliquid fiat* she went once a week to the nearby city to have treatment with X-rays. Soon thereafter she began to gain weight and recovered so completely that she lived for almost twenty-five years, dying at a ripe old age, unfortunately during World War II while I was in America and long after her gynecologist had passed away, so that nobody thought of having an autopsy performed.

My own condition remained quite unchanged during the years preceding the war. Those were busy years, during which the Johns Hopkins Institute of the History of Medicine was developed, the *Bulletin of the History of Medicine* and several series of monographs were founded, the American Association of the History of Medicine extended its activities—years of research, of teaching, of administrative work. Knowing that war was bound to come, I took advantage of these last years of relative peace and went abroad every summer for extensive study tours, working in libraries and archives, or doing field work in social medicine. And at the end of every summer, before resuming academic duties, I went to see an old friend in Zurich, a distinguished heart specialist, to have a chat and to have a few tests made. The blood pressure was invariably the same, about 160/110, and after X-ray, electrocardiogram, and urinalysis were found to be unchanged also I sailed back to America determined to carry on as in the past. I never felt sick or handicapped in any way.

Matters changed as a result of the war. When America became involved in the conflict, our younger colleagues joined the armed forces and we, the old generation, did their work. For a number of years I had three full-time and a half a dozen part-time jobs. This was very strenuous. It meant having a seven day working week without any break, with sleeping time reduced to a maximum of five hours. It was decidedly not the way of life usually recommended to hypertensive individuals. But then others were dying on the battlefields; why should we not do our share on the home front with all the risks involved?

I was able to carry on during those years of war because every summer I spent a few weeks at Saratoga Springs with immense benefit. I know that the average American doctor does not think very highly of spa treatments and considers them rather some kind of psychotherapy if not outright quackery, while in Europe mineral springs have been used with good results for the last 2000 years in the treatment of chronic diseases.

tutor, and at the end of the year we were reading the Panchatantra and similar texts.

In those days the University of Zurich was rather weak in oriental studies, and this determined me to spend most of the year 1911 in London. I had some excellent courses at University College, and since I was the only student attending them learned a great deal. With Mabel Bode I read the Meghaduta and with H. Hirschfeld the Fakhri and the *Delectus Veterum Carminum Arabicorum* of Noeldeke. At the same time I began the study of Chinese at King's College and devoted a great deal of time to it. My teachers were rather skeptical and repeatedly pointed out to me that it was impossible to embrace the whole Orient, that I would have to specialize either on the near East, on India, or on the far East. But I refused to specialize. I was interested in the East as a whole, in comparative religion and comparative literature, in the migration and transmission of literary subjects and similar problems. And since I was very young I thought that nothing would be impossible to me.

I worked very hard in those years and always had some grammar in my pocket and a notebook full of Chinese ideograms. But the time came when I had to admit that my teachers were right. It could not be done. The task became so big that quite physically I could not master it. But I still refused to specialize, and since I had always been greatly interested in science I went back to the University of Zurich and took the science courses that were given to students of science as well as to medical students.

There, again, it was my good fortune to have a great teacher, the Professor of Zoology and Comparative Anatomy, Arnold Lang. He was a former student of Haeckel, a great expert in zoology of the invertebrates and in genetics. His lectures were entrancing, and we never missed a single one. During a course he never attempted to cover the whole field but discussed only a few selected subjects, a few animal forms, elements of genetics, or similar topics. These he presented in great detail, giving the history of the problem and discussing general principles connected with it. He could spend weeks developing the structure of one animal, drawing it in colored chalks on the blackboard. And when, at long last, he had given the finishing touch, his bearded face brightened up and he felt like God after the creation of the world. He had recreated the worm or the fish under our very eyes. And having watched this creative process we could never forget it. We had been allowed a glimpse into the workshop of nature.

but as long as the mind is alert and functions normally there is no reason why we should not accept our lot joyfully.

Every chronic illness presents special problems. With a cardiovascular disease, you know that you will not live to a very old age and you also know that the end may come suddenly. How many of our friends and acquaintances have been stricken all of a sudden, out of a blue sky as it seemed, in the street, at their desk, in the lecture hall, or have passed away in their sleep. Since the time left is limited, we must plan carefully so as to use it to the utmost. We must decide which part of our work we consider the most important, and this we must try to carry out no matter what sacrifices it may require.

In my own case I gave up an academic position that I loved and set up my workshop in the country in a small village in Switzerland in order to write an eight volume book that I had been preparing for many years and that war work had prevented me from beginning sooner. I felt that without this book my life's work would remain very fragmentary, and that I must give up all other activities for the sake of this one project. I was able to do it because an American university was prepared to support me and my work for a number of years. I am well aware that this is an unusually liberal and generous attitude of a university, and whatever I may achieve will to a large extent be due to this unselfish support. Most professors with my illness would have had to remain in their position and wear themselves out with teaching and endless routine without being able to complete their essential work.

I think this feeling of not having completed your work, of still having a message to deliver, of wishing to sum up thirty-five years of research and manifold experience, is not only a strong incentive but at the same time an important therapeutic factor. You organize your entire life around the project, do anything that will further it, and avoid what may be detrimental to it. An inveterate smoker, I found it very easy to give up smoking when I began writing my present book. We know of many people who kept alive until they had finished their task and then collapsed. Marcel Proust wrote his masterpiece, *A la Recherche du Temps Perdu* under tremendous handicaps, worked feverishly, in bed most of the time, and when he had recreated his past life and the society in which he had lived he died.

Of course, we know of other people who died before they had completed their work, who were torn away in the midst of it. Yet we observe quite often that the desire to live to a certain date keeps patients

mechanisms available to the organism to react against lesions. The rest boils down to observation and correct reasoning." And this was what we learned from him first of all: to observe phenomena and to reason correctly. I followed his precepts all through my studies, and it saved me a lot of trouble. Von Müller's teaching was so impressive that to the present day I remember every individual case he presented during the course and even remember the face of many of the patients. The classroom was crowded with hundreds of students, and a regular race for seats took place every morning.

Sauerbruch was an entirely different personality. He came from Marburg to Zurich in 1911 as Professor of Surgery. He was young, enthusiastic, and temperamental. Students loved him or hated him, but nobody who ever came in touch with him remained indifferent. He was an intuitive type of man, a brilliant surgeon who in his surgery as well as in his researches showed a great deal of imagination and originality. His clinic was inspiring and spectacular. Once, desiring to impress upon us the importance of the early operation of appendicitis, he demonstrated over twenty cases in one clinic, some of whom had been sent in for operation too late. Bed after bed was rolled in. The professor hardly said a word, but the difference between the patients was striking. All those who had been operated on early looked flourishing, while the others looked very sick. It was a piece of showmanship, but nobody ever forgot the lesson. Sauerbruch taught us infinitely more than surgery. He made us think—think in terms of biology. A student could pass an examination with him without knowing many facts provided he was able to approach a case intelligently and to think properly. In his early years in Zurich Sauerbruch gave a course in general surgery that was attended by students of all classes, by the faculty, and by the practitioners of the city. One had to be there an hour in advance to secure a seat. Every single lecture was a masterpiece, well rounded, full of original ideas and challenging thoughts. It was certainly not by accident that Sauerbruch, like Müller and all great medical teachers I ever had, was deeply interested in the history of medicine and never missed an opportunity to make historical remarks. Men who made history were always aware of developments in which they were taking part. I was Sauerbruch's student for three years and came closer to him than to most of my medical teachers. He took a genuine interest in young people and kept an open house in which students were always welcomed. During the war he took a group of us on a most instructive tour through German military hospitals, and

biochemist, who requires laboratories for his work, or an engineer, it is more difficult to change his mode of living. But I think that everyone with hypertension can adjust in some way or other. If he cannot slow down in his accustomed occupation, there is bound to be another that he may take up. It is important for us to realize that we can lead a satisfactory life on a much smaller income than we used to have. With a sharpened sense of values we soon find out that much that we thought we had to buy was quite unnecessary. The more philosophical our general outlook and attitude toward life has been, the easier our adjustment will be. Once we are getting on in age, we draw from the intellectual and moral capital that we have built up during a lifetime and we reap what we have sown.

Of course it would be absurd to think that a cardiovascular condition of twenty years' duration does not present any subjective symptoms. You cannot run or carry weights without getting out of breath and feeling some oppression in the chest. But you soon learn that if you have to catch a train you must be at the station in time, that you must get a porter to carry your bag, and that it is safe to have nitroglycerin tablets in your pocket.

So far I have not noticed any signs of impaired memory, or very few, and I think we can do something to train our memory and keep it fresh; for example, learning difficult poems by heart—a few verses every day while shaving—or engaging in the study of foreign languages. For the last fifty years I have devoted one-half hour to language studies every morning, learning and practicing Greek, Sanskrit, Arabic, Russian—whichever I happened to be interested in at the moment or needed most for my work. If you learn three new words—and their use—every day, you not only train your memory but also acquire a sizable vocabulary in many tongues in the course of time, and you will enjoy foreign literatures as you never would if you had to rely on translations.

Prolonged hypertension decidedly leads to certain personality changes. I used to be rather thick-skinned and now have become very sensitive, irritable, impatient, getting excited at times over trifles which I should not have even noticed in the past. This can be counteracted to some extent through will power or certain mental exercises, and on some occasions one may have to take recourse to sedatives. This increased sensitivity has its great compensations. You not only worry more but have much deeper joys. You experience music, poetry, the fine arts, much more acutely than ever before. And, if you have the priceless privilege of living

year in army service while we could continue our civilian work during the other half.

The two years in the army were a valuable experience to me in many respects. Medically I learned a great deal. We were often stationed in far remote mountain valleys where we had to attend the civilian population as well as the troops, sometimes under very difficult conditions. Much of the work was practical public health work in which I became greatly interested. The Medical Officers' Training School gave excellent instruction not only in war surgery but particularly in public health. In 1918 I had the good luck of being one of the first in my division to be stricken with influenza so that I was fit again when many of my fellow medical officers were sick. I spent most of the year treating influenza patients in a variety of troops and regions and worked for several months in the Influenza Bureau of the Surgeon General's office, from which I was sent out to make epidemiological surveys all over the country.

But the army was a great school to me in other respects as well. So far I had lived the life of the middle class and had moved mostly in academic circles. I was interested in social problems but looked at them more from the theoretical and public health angle. In the army I came in close touch with the working class. In the cavalry, to which I was attached for over a year, the soldiers were peasants; in the artillery, to which I was transferred later, they were factory workers, most of whom were employed in several large metallurgical plants in the vicinity of Zurich. These anonymous soldiers became my teachers. They opened my eyes about many problems that I had not seen before and made me realize how little I knew about the world in which I was living. They made me visualize a field of research and activity equally important to the historian as to the medical man. They had confidence in me, and on many evenings I went to the sickroom under the pretext of a late ward round, sat on a bed, and listened. They discussed their own problems and discussed the war. And it often struck me how much more convincing their interpretations were than those I heard in the officers' mess. Switzerland, neutral but surrounded by warring countries, was an ideal post from which to observe events. Information was obtainable from all sides, and it was much easier to get at the truth than in those countries where unilateral heavy propaganda obstructed the vision. The imperialistic character of the war soon became apparent, and it was not difficult to realize the full significance of the Russian Revolution.

The armistice was signed and the war was over, at least nominally. I

where the cat takes the place of a hot-water bottle, and where we may count on a decent cup of tea.

We all know what the final stages of such a cardiovascular disease are. There are various possibilities, some of which are less desirable than others. We also know that death may come unexpectedly from an unrelated accident or some intercurrent disease that a weakened heart is unable to overcome. But whatever fate may have in store for us, we must be prepared to accept it and to die as we have lived, rejoicing at the thought that it was given to us to live through a fascinating period of history and to take an active and creative part in it on the progressive side to which the future belongs, rejoicing also in the knowledge that we are leaving children and former students behind who will carry on from where we stop.

nals and serial publications. His bibliography shows that in certain years he published over forty papers—mostly medieval medical texts that he had discovered in his annual peregrinations. He was a poor lecturer, was restless in his thinking, so that he could jump abruptly from one subject to another without finishing his sentences. The lectures, therefore, were rather confused, and it was hard to follow him. He exerted his tremendous influence not through teaching but through his writings and personal contacts. He had a kindly nature and could be very jovial, but he could also flare up and in such moments he looked like *Jupiter tonans*. His eyes sparkled, and his voice was thunder. A dominating and domineering personality, he could not tolerate to have anybody beside him and colleagues who did not accept his leadership were excommunicated pitilessly.

He was different to me. He was infinitely more than a teacher, was like a father to me. My first visit in 1919 was the beginning of a very close association that lasted for many years. From 1919 to 1925, whether in Leipzig or in Zurich, I was in constant touch with Sudhoff. He supplied me with books, photostats, and photographs from the institute collections and helped me in any possible way. I had the privilege to assist him in reading and correcting galley proofs of several of his books, and we met every year at the annual meetings of the German Society of the History of Science, Medicine and Technology. From 1925, when I succeeded him in the chair at Leipzig, to 1932, when I left for America, we met almost daily and there was not a thing on earth that we did not discuss. In 1933 I was awarded the Karl Sudhoff Medal, and on the occasion he wrote in long-hand an appreciation of my work that I treasure more than anything else. After that time, to my deep sorrow, our close relationship gradually came to an end. Karl Sudhoff had joined the National Socialist Party. It was a profound shock to me, and for a long time I could not understand how he, a staunch liberal and rationalist all his life, could at the age of eighty become a Nazi and identify himself with Hitler's doings. I have only one explanation for it, that he was driven by his fanatic patriotism. He deeply felt and resented the humiliation of Germany after Versailles, and like so many others must have honestly believed that Hitler would be the savior of his country.

Karl Sudhoff died in 1938. He was the great pioneer in medical history, who not only advanced the subject by leaps and bounds through his researches but also organized it and gave it a definite place in the medical curriculum. The Leipzig Institute was the first research institute ever

truffles and at the end some of the fat from the turkey. Do not forget salt and pepper. If you happen to have a maid, tell her to come after the dinner to wash the dishes and serve the turkey yourself, because meat and sauce must be served together steaming hot—which a maid never does.

This truly is a delicious dish, and I shall be glad to give a more detailed recipe to any member in good standing of the American Association of the History of Medicine who is a qualified cook. Every year I used to prepare such a turkey for the benefit of the family and of a few friends. But now the trouble is that there are no truffles. Because truffles come from France. And because we have not yet reconquered the Périgord, the province where they are cultivated. And because if we had reconquered it the Nazi General Staff would have eaten up the last crop anyway.

Truffles grow also in England but these truffles belong to a species that is much inferior to *Tuber melanosporum*, the best truffle of France.

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The Army Medical Library, which fortunately has a broad concept of medicine, possesses some literature on truffles, among which I found an interesting pamphlet written by a French physician, Pennier de Longchamp fils, and published in Avignon, in 1766: *Dissertation Physicomédicale sur les Truffes et sur les Champignons*.

The author tells us how he came to write this treatise:

Discoveries are often made by accident and light conversation may result in useful investigations. The dissertation that I am presenting to the public owes its origin to a joke that was made during a meal about a young man who was eating a great many truffles. Since my profession obliges me to know the virtues of all the plants, I was addressed and asked what effects truffles had. I answered that the general opinion was that they were invigorating and that the gentleman finding himself in a weakened condition undoubtedly thought that he should eat many truffles in order to restore his powers. The meal was hardly over when I made it my first business to analyze them.

We can well imagine what the situation was. Avignon at that time was the same provincial and gossipy town that it is today, with old houses and narrow streets, with people who have a keen sense of humor and like good spicy food and the wine that grows across the river. In the shadow of the Palace of the Popes a group of them had come together for dinner. A dish was served, hot truffles that had been sprinkled with brandy,

long lecture tour through all sections of the United States. And while I was traveling I was offered Dr. Welch's chair.

I was tremendously impressed by the United States. I found democratic institutions dear to me and found the country utterly different from what it is usually pictured by European travelers who see only the façade and the material aspect of American life. I was particularly impressed by the universities, by their earnest desire to raise standards of scholarship and to carry on the torch of learning. I found them fully aware of their great responsibility at a time when European institutions were breaking down under political and financial pressure. Great interest was shown all over the country in medical history, the importance of which had been emphasized by all medical leaders. And I found urgent social problems of medicine eagerly discussed by all groups involved. The Committee on the Costs of Medical Care was at the peak of its activities. What appealed to me particularly was the dynamism of America and its brave experimental spirit, so utterly different from the stifling self-satisfaction and fossilizing feeling of superiority so often met with in Europe.

In Germany things were developing from bad to worse, and it was apparent that the days of academic freedom were counted. It was not difficult, therefore, to come to a decision. Once more I was successor to a great man, in one of the world's great medical schools, in a university justly famous for its scholarship and liberal spirit. I was in charge of a young institute, in a young and vast country--and I have enjoyed working in America ever since I first landed in the new world.

§

Ladies and gentlemen: I apologize for this lengthy personal history in an address devoted to the subject of university education. But instead of discussing the topic in a purely theoretical way I preferred to give you a practical demonstration in evoking the figures of some men who were great academic teachers and in discussing factors that contribute to the success of university education. Let me add a few remarks.

When I look back at my early university life, it occurs to me that such a career would be rather difficult in America as well as in South Africa. Our students are so well protected, are guided and advised so well that they have hardly a chance to make mistakes. Much thinking is done for them, and they hardly have an opportunity to find things out for them-

champ adds, "it would not persevere in a labor that is in no way profitable."

The trouble with pigs is that they are wilful animals which, moreover, tire very rapidly. Hence dogs are also used for the purpose. They must be conditioned, while they are still puppies, by having chopped truffles added to their food. If they are well trained, they may render great services, and, of course, you do not reward their efforts with acorns but with bread and cheese.

And then there is a third method that you may use when you have neither pig nor dog. In such a case you walk to the oaks where you expect truffles. You lie flat on your stomach and look at the landscape that surrounds you. If you see a swarm of tiny flies over a given spot you may hope to find a truffle there, because these are truffle flies that have the vicious habit of laying their eggs in the fungus.

"Truffles," Pennier de Longchamp tells us, "are usually served as *entremets* and our gluttons or our Epicures eat many of them because they assume that they precipitate what has already been eaten and thus develop new appetite." Medically truffles are hot and "one must admit that this is not one of the best kinds of food neither on account of its qualities nor of its modes of preparation; and individuals of sanguine and raw temperament should not eat them, nor those who by vocation are obliged to lead a life of chastity."

As modern physicians and on the basis of many years' experience, we can safely state that a truffled turkey with sauce Périgueux does not involve any health hazards. The heat it produces is hardly more than a pleasant feeling of warmth—and it certainly does not cause syriasis.

§

Since we cannot obtain truffles from France, we obviously look to America as a source of supply. We live in a great country that produces almost everything. Why should we not have American truffles?

And indeed there was a time when there were reasons for supposing that the truffle was a native of the United States. In 1812 a famous American doctor and chemist who was even a professor at Columbia University, Samuel Latham Mitchill (1761-1831), published the following letter in his own journal, *The Medical Repository*, comprehending original essays and intelligence relative to medicine, chemistry, natural history, agriculture, geography, and the arts; more especially as they are culti-

on a subject. He has an ideal opportunity to stimulate the student, to arouse his curiosity, or to challenge him, in other words, to make him think.

We can study a symphony at home from the score and phonograph records, but this does not make concerts superfluous. In a concert we hear the interpretation of a symphony by a definite conductor, and there is that magnetic contact between orchestra and audience that is so hard to define. The concert, moreover, inspires us and stimulates us to study music of which we had not thought before.

As a student I had a simple method which I found very helpful. When I knew what the subject of a lecture or a clinic would be, I read about it before so as to have a certain preparation. During the lecture I made a few notes, as few as possible, just enough to be able to reconstruct the lecture. Students who write much do not listen. And then in the evening I consulted a number of books on the subject and wrote a summary of what I had read and heard, made notes about my personal impressions and doubts, and marked points that would require further study. I did it on loose leaves so as to be able to add to it on later occasions.

In the medieval *disputatio*, professor and students discussed a subject, weighing the pros and cons of an argument. The corresponding modern form of teaching is the seminary course that was so strongly developed by the German university. Here the students take an active part, presenting papers, reporting on studies made, and the professor's function is to lead the discussion. Here the professor has an opportunity to teach methods of research, to show the students how to approach a problem, how to get at facts, and how to interpret them.

The rise of modern science called for new forms of academic instruction unknown to the medieval university: laboratory courses and clinical instruction at the bedside of patients. These new methods of teaching, so highly successful in the natural sciences, begin to be applied to the social sciences. Political science cannot be taught in the classroom alone. It requires field work in parliaments and government offices. Economics is a dead subject if the student has no opportunity to watch the process of production and distribution in mines, factories, farms, shops, railroad offices, and the stock exchange. And if sociology is to be more than the philosophy of history it requires still more extensive field work. The best curriculum is one in which the various forms of instruction, lecture, seminary course, and practical work, are perfectly balanced.

The task of university education is not to transmit an established body

soil; such as is best adapted to the culture of maize. Though they are sometimes found in soils of a different quality. They are frequently seen as large as a man's head, and proportionally heavy when fresh; but lose a very great proportion of their weight by drying."—

From this history, there can be no doubt that the Tuckahoe root is one of the *under ground funguses*. It seems indeed to be a species of *Truffle*, or *esulent mushroom*. In this point of view, it becomes quite an interesting object of research. To determine this, consider the character and qualities of the European Truffle.

Lycoperdon tuber.—The figure is nearly spherical, the size of a potatoe. The external coat at first white, afterwards black, and studded with pyramidal or polyedrous tubercles; the internal substance solid and callous, of a dirty white or pale brown colour, grained like a nutmeg, with serpentine lines; in which Micheli says, are imbedded capsules, containing seeds. In Great Britain they seldom exceed three or four ounces in weight; but in Italy and some other parts of the continent, they are said to have been found of the extraordinary weight of eight, and even fourteen pounds. They are served up for food either fresh and roasted like potatoes, or dried and sliced into ragouts.—Called in English, *Truffles*, or subterraneous puffballs, growing generally three or four inches under ground, without any visible root.

Having thus drawn the comparison between this American Truffle, and that of Europe, there is reason to believe although they belong to the same genus, there is nevertheless, a specific difference.

This difference I hope some of our enterprising botanists will soon explain, and give us every memorable particular concerning it, in an authentic and explicit form. And permit me to say, I expect much from you.

With sentiments of esteem,

I am, etc.

SAMUEL L. MITCHILL.

Mitchill was certainly right when he diagnosed the vegetable in question as an underground fungus, but he was unfortunately wrong when he thought that it might be a species of truffle. Tuckahoe, as it is called in Algonquin, or *Pachyma cocos* Fr., or *Lycoperdon solidum* Gron., is considered to be a fungus sclerotium that grows as a saprophyte or even parasite on pine roots several feet underground.

The *Louisville Medical News* of 1877 (4:88-89) published an article by E. Scheffer on *Pachyma cocos* or tuckahoe, hickory pone, Indian pone, Indian bread, which begins:

To Prof. L. P. Yandell, jr., I am indebted for a specimen of this fungus, which he obtained from Dr. Kendrick, of Mississippi. The latter says, in his letter to Dr. Yandell: "As a rule, the pones are not found near the stumps or rotten wood, and are seldom found in old land, but generally in soil that has not been under cultivation, or only for a few years. The most of them are nearly round or oval, from the size of a turkey-egg to that of a man's head. Although he has seen more than a hundred, he does not remember to have seen more than two with a nucleus in it. He has

people to be physicians and lawyers, but medicine and the law were part of the general philosophy of the time and therefore close to theology. And the students of medicine and law were first trained for many years in the faculty of arts. The goal of university education was to produce an all-round scholar, an ideal that was carefully preserved for centuries. The word doctor means scholar, a point that we sometimes forget. Conditions changed in the nineteenth century when the development of science led to increasing specialization. A deep split occurred between the humanities and the new science. Many universities today are merely conglomerations of professional schools with hardly any bond between them.

Specialization occurred by necessity. No man can possibly embrace the entire realm of knowledge. If science, medicine, and technology have progressed so tremendously, it was largely due to the specialization in research. We need highly trained specialists. But we need more than specialists. If there is so much trouble in the world today, and if it is so extremely difficult to make necessary adjustments, it is to a certain extent due to the fact that many men in leading positions are nothing but narrow specialists whose general and political education has been utterly neglected.

We who have the privilege of living in a democracy have not only professional duties but also duties as citizens. We have responsibilities not only toward our families and the institutions in which we work but also toward the community and society at large. How can we expect a democratic state to function efficiently if those men who had the maximum of education, who were trained in universities, are mere specialists unprepared for their civic duties, unwilling to assume responsibility and leaving the welfare of society in the care of politicians whose only qualification very often is that they like the game and find it profitable?

It seems to me that here the university has an extremely important function to fulfill. The point is not to set the clock back and to return to the Middle Ages. We shall continue to develop highly trained specialists, but we must give them a broader equipment. In South Africa, as in England, students enter professional colleges immediately after leaving secondary school, which greatly reduces the opportunities for general higher education. In the United States, the requirements for admission to a professional school include either a completed or at least a few years' course in a college of arts and sciences. This is better but still not enough. General education must continue in the professional schools and must be correlated to the subject of the course. Whatever a man's specialty is

them. We have intelligent pigs and very clever dogs so that there is no reason why we should not develop a Périgord in America.

Yes, but there is a snag, namely, that it takes many years to develop a truffle industry so that it will be profitable. Once the soil has been prepared and acorns or seedlings of the right kind of oaks have been planted, truffles may appear after about five years, but it will be five to ten more years before the yield may become profitable and perhaps twenty-five years before it reaches its maximum. Hence the prospect of a truffle industry cannot be very attractive to our individualistic system of free enterprise. We have not such strong dynastic feelings that we would sow for the next generation to reap. Oh, we like to call ourselves John Doe, II, III, IV, V, . . . We also have a very soft spot for kings—as long as they are in Europe. As a matter of fact, there are several kings today whose crowns are tottering and who look to us as to their only support. But when it comes to investments we like quick returns.

The production of American truffles, therefore, would have to be developed as a government project, by Washington "bureaucrats," under the auspices of the Department of Agriculture. But then—good God!—the truffles thus produced would be socialized truffles. One might even call them "sovietized truffles," and it is obvious that no self-respecting Republican could eat them.

I can well imagine what the reaction to such government truffles grown at the expense of the taxpayer would be. The National Manufacturers Association and the Chamber of Commerce would issue a violent protest against such unheard-of government interference that was undermining the American way of life. The Council on Foods and Nutrition of the American Medical Association would investigate the matter and would publish a memorandum pointing out that truffles are un-American, a European racket for which there was no need in this country. They would draw attention to the fact that under our American system we had succeeded in raising the biggest and best turkeys in the world, that there was a turkey for everyone who knew how to ask for it, that bread stuffing was much preferable not only because its nutritional value was much greater than that of truffles but because it conformed to American life. Whereupon the House of Delegates would pass a resolution with all votes against those of California—where good food has always been appreciated—condemning the use of truffles. The doctors of Indiana would even go one step further and would organize an association of American physi-

trained in this university will exert a marked influence upon the destinies of the country.

I shall be proud to wear your colors in America and I want you to consider me an American outpost of the university who will always be happy to serve you.

And so let me end by saying: Long live, grow, and flourish *our* university—the University of the Witwatersrand.

THE SPELLING
OF PROPER NAMES,
OR
THE IMPORTANCE OF
BEING ERNEST

EVERY historian and bibliographer knows how difficult it often is to ascertain a man's correct name. In Europe before the nineteenth century the spelling of family names was not rigidly fixed. They were written phonetically, and, since the same sounds could be expressed in different ways, the spelling often varied a great deal. I once published a letter written in 1766 by a Swiss physician whose name occurs as Aeppli, Acppli, and Eppli. Since the family still flourishes and today writes its name Aeppli, my doctor is usually found in the literature as Johann Melchior Aeppli, but in the letter I published he spelled his name Eppli.

It frequently happened that a man changed his name deliberately. Napoleon's family name was Buonaparte, and he changed it into Bonaparte, which sounded less Italian, a spelling that was generally accepted, although not immediately. His aristocratic enemies liked to call him Buonaparte in order to recall his humble origin.

In the case of famous men of the past, a definite spelling has been established and today nobody would think of spelling Shakespeare in any but the customary way. But in the case of minor deities it is often very difficult to decide which spelling should be accepted and confusions are unavoidable.

In the nineteenth century most European countries required individuals to be registered with the authorities, not only at the moment of birth and death, but whenever they established a new residence, and everybody carried a load of official documents identifying himself. Names

advisable to aid nature by draining the pus through an artificial opening. Where should the physician open the chest? The Hippocratic doctor reasoned that empyema was an inflammatory disease in the course of which heat was developed. The pus must be found at the point of maximum heat, and how could this be ascertained? In a very simple way: a mixture of fine clay and water was applied very rapidly to the back. Where it dried first, there was the maximum heat and there the incision was performed.

Today my pneumonia—it was an ordinary pneumococcus infection—instead of developing into empyema and keeping me in the hospital for many weeks, would be cured in a few days, and this reminds us of the fact that the historical moment at which our individual life unfolds has a strong bearing on our health and illnesses. How many of our contemporaries with diabetes, pernicious anemia, and a variety of other diseases are kept alive today who would have been lost inexorably only yesterday, and how many people today are dying young on battlefields who might have lived to a ripe old age had they been born around the middle of the last century. It would be a vain undertaking to try to decide whether it is hazard or fate or whatever we may call it that determines what happens to us beyond our individual chromosomes and behavior. To Paracelsus the stars symbolized this impact of time on our life, and he spoke of *ens astrale* as a sphere from which disease befalls man. The fact remains that the point in time and also in space at which we live is extremely important.

And then for many years I never had any serious illness. Like everybody I had an occasional cold or upset stomach, and I am ashamed to say that I greatly enjoyed these minor ailments. It is a sad comment on our way of life that we must have a sore throat, a bronchitis, laryngitis, or gastroenteritis, in order to have a few days of real rest. An interesting essay could be written on the hygienic significance of minor ailments. By forcing us to rest they may prevent more serious illness. Of course, it would be better to break the long winter by taking a trip to the West Indies. But how could we get away in the midst of the academic year, and what professor has the money for such a trip anyway?

Bronchitis or some such disease is the cheapest way of having a vacation, and spending a week or even a few days in bed is the best rest we can have. The discomfort is nothing to speak of; we catch up with sleep and accumulate a reserve for the weeks to come, we eat little and take off a few pounds, and we have the time to read all the books that have accumulated on our desk. However, in order to enjoy the privileged

since it is almost impossible to identify a European name from Chinese characters the publisher had added my name in Latin type, and there I became Henry S. Sigerist.

My middle name is Ernest. I was born and brought up in France, and on my birth certificate my middle name was spelled in the French way, Ernest. Thus it remained ever since, for over half a century. Whether I lived in France, Switzerland, Germany, England, or America my middle name still was Ernest. I was therefore very puzzled when I noticed that in America I was frequently and sometimes in very formal documents addressed as Henry Ernst Sigerist, with my middle name spelled in the German way, and I often wondered what the source of this misspelling was. *Who's Who* and other biographical dictionaries list my name correctly. Their entries are based on questionnaires, and galley proofs are usually submitted to the persons involved so that their data are fairly reliable.

At last I found that the source for the misspelling of my middle name was the Catalogue of the Library of Congress, where I appear on the printed cards as Henry Ernst Sigerist, and the fact that these cards are widely distributed in America explains the frequent misspelling. The Library of Congress does not attempt to ascertain an author's correct name. The arbitrary rule is "give forenames in the form most common in the author's native or adopted language, or in doubtful cases, in the form proper to the language in which he has written most of his works."¹ My first books were written in Switzerland and published in Germany. Hence I became Ernst, and although my native language was French and my adopted language is English, and although by now the majority of my works have been written in English I am and shall remain Ernst—to the Library of Congress.

More complications arise when a name has to be transcribed into a foreign alphabet. The first time I went to Russia, my name was entered into the visa as Са́йгерист (Saigerist) because the clerk at the consulate assumed that in English it was always pronounced that way. The second time I became Зигерист (Zigerist), and the third time I put a slip into my passport indicating the pronunciation of the name by transcribing it myself. I am afraid I must have caused some trouble to the Commissariat of Internal Affairs, but, efficient as they are, they undoubtedly made cross references.

¹ American Library Association, *Catalog Rules, Author and Title Entries*, Chicago, American Library Association, 1911, p. 43.

advisable to aid nature by draining the pus through an artificial opening. Where should the physician open the chest? The Hippocratic doctor reasoned that empyema was an inflammatory disease in the course of which heat was developed. The pus must be found at the point of maximum heat, and how could this be ascertained? In a very simple way: a mixture of fine clay and water was applied very rapidly to the back. Where it dried first, there was the maximum heat and there the incision was performed.

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THOUGHTS ON THE PHYSICIAN'S WRITING AND READING

I THINK it is an excellent idea to devote a number of this journal to the problems of medical writing, although I am not quite sure that there is such a thing as medical, chemical, physical, or agricultural writing. There is good writing and bad writing no matter what you write about, but I know that many physicians, young and old, are puzzled and worried when they have to write a paper. As an academic teacher who had to read student papers, as editor of several journals whose daily task was the reading and editing of papers, I know what enormous difficulties many doctors experience when they have to express the result of their work and experiences in writing. So there can be no doubt that a series of articles devoted to this subject must be welcome.

There may be no medical writing in the strict sense of the word, but it is obvious that the style varies according to the subject under discussion. It makes a difference whether we write a poem, a literary essay, or a scientific paper. The language used also makes a great difference. Cicero could write monster sentences and yet be perfectly clear. The German language permits the use of long sentences which seem obscure chiefly to those who do not master the language. French is perhaps the most elegant vehicle for carrying thought, scientific and otherwise, and many French medical writings, case histories of Charcot, papers of Pasteur, Claude Bernard's *Introduction à l'Étude de la Médecine Expérimentale* are literary masterpieces. Few countries have insisted so much on style in scientific writing.

ture, the polluted air of many of our cities, the overheated rooms in which we live during the winter, may be partly responsible for this. Having worked in a library for many years, I know what fatal effect the damp heat of a Baltimore summer followed by the dryness of an overheated building in the winter has on the leather bindings of books, and I can well imagine that the tender mucous membranes of the nose do not react in a particularly favorable way to these external factors. I was treated with penicillin when the drug was still in its experimental stages, was treated with radium, was operated on. Most treatments gave me temporary but no permanent relief. It could never be established with certainty whether the disease was due to a chronic virus infection or to an allergy.

At any rate, I have it and will in all probability keep it to the end. It is a nuisance, I cannot deny it, and many times I envied our Baltimore Negroes with wide-open noses which seemed to guarantee them perfect ventilation. The degree of comfort or discomfort I experience depends to a large extent on the weather. There is an optimum humidity which makes it possible for me to breathe quite freely. With a higher or lower degree of dampness, however, the membranes swell and cause nasal obstruction. All you can do is accept the condition and have some drugs in readiness with which you can keep the nose open when you need it most—at night, when giving a lecture, at a conference, or at some other critical moment. This too is a very minor ailment compared with my third incurable disease, which is a serious one, a killer.

Almost twenty years ago, when I joined the faculty of an American university, I intended to combine a life insurance policy with the professor's retirement annuity, and the medical examination very unexpectedly revealed that I had a marked hypertension, with traces of albumin and a few casts in the urine, and with a slightly enlarged left ventricle. Perhaps it should not have been quite unexpected, because I knew of several male members of my mother's family who were suffering from hypertension, and several had died from cardiovascular diseases. I was overweight, moreover, was a heavy smoker, taking practically no exercise—leading anything but a hygienic life.

According to American usage I was not accepted by the life insurance company. Later I learned that Swiss companies do accept hypertensive individuals at a slightly higher premium. Quite generally I found that the attitude of the medical profession toward hypertension is different in Switzerland—and in other European countries—from that usually encountered in America. Much less fuss is being made. Statesmen, business-

languages, for over thirty years, but still today I am frightened when I enter the lecture hall. Of course the moment you face and address your audience the fear disappears, and some magnetic bond is established between you and the people you talk to. At the end you are exhausted because you have given yourself out, body and soul. I often thought that, should I no longer be frightened before a lecture, that is, should I no longer have the deep respect that is due an audience, any audience, the lectures would soon become very poor.

What applies to a lecture applies in a much higher degree to the writing of a paper or, still more, of a book. The audience you address is larger and is not only today's but also tomorrow's audience. When you talk you have more license than when you write. In a lecture you may use colloquial words which you must avoid in writing. You may begin a sentence without finishing it if the following sentence takes up and develops your thought. You may even, though one should not, use profane words to emphasize a point, but you should never do such things in writing.

I think every writer develops his own technique in the course of time, and I can discuss here only the advantages and disadvantages of my own way of writing. When I have decided to write a paper or a book I feel "pregnant" with it for a long time, and since I have usually half a dozen literary projects pending I feel "pregnant" with a whole litter. I have the subjects constantly on my mind and make notes at any hour of the day or night. I always have sheets of paper of uniform size handy, and every evening I sort the notes and put them into their respective folders. Then comes the day when you are ready to begin writing. Usually it is some pressure from outside that determines the date, an irate editor who reminds you that the deadline for your paper was three months ago, or a publisher who has been waiting patiently for years for a manuscript but would now like to have it very soon. Life is short but the art is long, and one never feels quite ready to write, being too much aware of gaps in one's knowledge. Still, unless one is a hopeless perfectionist the day comes when the paper has to be written, and here the methods vary a great deal. Some people are able to dictate a paper or even a book. They correct what they have said, it is retyped, and the work is done. I am not one of them and dictate only lectures that I wish to publish, lectures for which I did a great deal of research and for which I have profuse notes. I never write a lecture before it has been delivered because a manuscript paralyzes me completely and also because I find that oral and written styles

everything had to be done to prevent a man from dying unprepared, without having confessed and received the holy sacrament of extreme unction. Today the commonly accepted view is that the physician should not do anything which might harm his patient, shorten his life, or even worry him unnecessarily. If a true statement about his actual condition or a prognosis might in any way be harmful, it should be withheld, particularly as the physician's words may easily be misinterpreted at a time when radio, newspapers, popular magazines, and advertisements are pouring out half-baked information on medical subjects. This sounds very simple but is not, and here as everywhere else the doctor must know his patient.

No two individuals are the same physically or mentally, and while some demand full honest information about their conditions, others are—unconsciously—grateful for being kept in the dark. I know members of my own family whom I as a physician would deceive to the very end because they could not take the truth, while I know others who would be deeply grateful if I should tell them the whole truth, because it would make it possible for them to organize their life, whatever is left of it, in the best possible way.

Of course, we must always keep in mind that in medicine there is no truth with a capital T, that medicine is what Celsus very aptly called it, an *ars coniecturalis*, an art in which you have to make guesses. There is more certainty today in our knowledge of diseases, in our diagnostics, and even in therapy than in the past, but the area of uncertainty is still very large. There is a school of physicians that strongly believes that hypertensive patients should use a saltless diet, while other schools think that salt does not affect the blood pressure in any way. And the advocates of a saltless diet are divided into two camps, those who consider the chlorine harmful and those who accuse the sodium of evil effects. Pharmaceutical firms have prepared condiments to take the place of salt, some of which contain sodium but no chlorine, while others avoid sodium but have chlorine. There are plenty of experiments and statistics available in support of all of these views. Which is correct and which wrong? We do not know. The explanation may well be that patients react differently.

When we have decided to enlighten a patient about his condition, we must never forget to tell him that there is always hope. Miracles do happen in medicine. My mother had a maid who had served her for nearly thirty years when in her late forties she rapidly lost weight. One of the best gynecologists in town diagnosed a cancer of the uterus and decided

had acquired a thorough knowledge of English in college. Some have, but very many have not. In America, not a few physicians are foreign-born. I am one of them, and I would like to give my colleagues a bit of advice. Work to improve your command of the language daily and quite particularly during the first years! After a while one acquires a rich enough vocabulary to express oneself fluently, though with an atrocious accent and making the same mistakes over and over again. I had the great advantage of having learned English as a child and of having spent some time in England before I came to America, but even so the change of my literary language was a great shock. I had written papers in French and Italian, very few in English. My first books were all written in German, and I had developed my own style, which was generally appreciated by critics. All of a sudden from one day to another I found myself transplanted into the Anglo-Saxon world and knew from then on I would have to write every line in English. I knew the language well enough to write a paper or to capture the attention of an audience in a lecture, but writing a book was a different matter. I had no trouble doing it but I felt that the style was poor, and it still is not the style I had when I was writing in German. Yet I worked on improving my language from the first day on and I am still doing it today after twenty-two years.

My method is very simple, and I can recommend it not only to foreign-born Americans but to everybody. It consists of reading good writers critically. I happen to like Aldous Huxley; his style appeals to me very much and I find that we have many thoughts in common. When I first came to America I took some of his novels—I had read them years before, but now I reread them critically, a few pages a day only, analyzing the sentences and making notes of words that I would not have used but that struck me as being very expressive. I also made notes of entire sentences, and in this way in a couple of years I increased my vocabulary and improved my syntax considerably. I still follow the method. The writers vary, but I am more anxious than ever to improve my style.

This brings me now to the doctor's reading. I know well enough that his time is limited, but he should be the more critical in the selection of his reading. I think everybody, no matter how busy he is, should spend at least two hours a day reading.

What should the physician read, apart from professional literature that he must read to keep abreast of a fast-developing science? Before we answer the question we must raise another one. To what end do we read? I think the answer is to learn, to improve ourselves, to enrich our life and

I am not competent to decide what biochemical processes take place in the human body during such a treatment. Scientific balneology is still in its infancy, but research is being pushed vigorously in a number of European countries, particularly in the Soviet Union.

What I do know is that a few weeks of complete rest and relaxation, away from everything and everybody, with light exercise, walks in the enchanting landscape of northern New York State, combined with a strict reducing diet, mineral baths, massage, nasal inhalations, did wonders for me. Each time I reduced my weight by ten pounds, my blood pressure went down by twenty to twenty-five points and stayed down for some time. I went back to work feeling light and rejuvenated.

One point I should like to mention and stress in this connection: namely, the importance of solitude and meditation. We are social beings whose life unfolds in a closely knit society. The city dweller, men in public life, academic teachers, physicians, business people, are practically never alone. From the moment they rise in a hurry in the morning to the moment they retire at night, tired and weary, they live in constant intercourse with other people. They never have any time to reflect about life, about the world, about their own doings. I think everybody should make an attempt to spend some time alone every year—if not a few weeks, then at least a few days—reassessing his life, trying to find out what was right and what wrong, making plans for the future, reviewing his scale of values. It need not be in a health resort, not even in the country. Many times have I been on a lone island, cut off from the world in the midst of Paris, London, or New York, and have experienced moments of profound solitude and great inspiration within the bare walls of a small hotel room.

§

In 1945 when the war came to an end I woke up to the realization of the fact that from now on I would be handicapped physically. It is quite a shock, at first, when you find out that the body no longer is the willing tool of the mind, when you discover that you cannot jump up the stairs any longer as you used to do but must walk up sedately like other people. At the moment I live surrounded by hills and mountains that I would love to climb, but I know that I shall never be able to do it. But then you very soon realize that these are very minor considerations. Once past the age of fifty, almost everyone has some kind of handicap. One is hard of hearing, another has trouble with his eyes, still another suffers from arthritis;

of Music a cantata. He hated doing it to order but *La Damoiselle Elue* was one, written in 1887 when he was twenty-five years old, and already it had all the infinite charm that France's great coming composer was going to have. I have the music on very good records, played them, and thus due to a few verses read in the early morning I had a perfect day during which I did more work than ever.

Another day I woke up and heard the rain pouring down. It was not dramatic rain with clouds piling up behind the hills as for a scene in a Wagnerian opera. The world was in gray, and it was going to rain steadily for twenty-four hours. I have a small but select library next to my bed; I took out a volume of the poems of Paul Verlaine, read:

Il pleure dans mon cœur
Comme il pleut sur la ville.
Quelle est cette langueur
Qui pénètre mon cœur?

Again I remembered the music that Debussy had written to these lines, and again a day which might have been one of gloom became a festive and most productive day, in spite of the monotony of the pouring rain.

I think another bit of sound advice is that one should never read the newspapers and magazines before having read at least fifty pages of a worth-while book. Of course we must read newspapers because as citizens of democratic countries we must keep informed of world affairs. I read at least five papers every day in four languages, but I find that not more than half an hour is needed to get all the news we are interested in. Most articles are a mere repetition of the headline, and once you know the event and the party line of the paper you need not read the editorials either. They are given, and you could write them yourself just as well. The same applies more or less to journals, and while we obviously cannot ignore them we should not spend too much time on them.

What then shall the physician read? Any good book written during the last 5000 years. It is a great mistake to read only new books. Of course we want to know what is being written today in various countries, how contemporary writers see and recreate the world of which we are a part. Many such new books turn out to be very poor in spite of much publicity and large editions. At least one half of the new books I read are not worth the time spent on them. We fare more safely with the classics, books that have stood the test of time. Apart from my professional reading, which obviously is quite extensive, I read about 100 books a year and I keep a record of them. At the end of the year I find invariably that

alive. Dr. Welch, after many months of illness spent in the hospital, saw the end approaching, but also the fiftieth anniversary of the day when he had joined the faculty of the Johns Hopkins University. And he wanted to live long enough to see that day. He spoke about it often, and indeed it was a memorable date—half a century in a university which during that period had become one of the great cultural centers of the nation and to the greatness of which he had contributed more than anyone else. To him it was symbolic of the fact that he had completed his mission on earth. The day came, and he thoroughly enjoyed the flowers and telegrams he received. Then his illness took a quick turn for the worse, and he died a few weeks later.

§

And now I have been living in the country, working on my book for over three years. I do not feel sick in any way because I am in an environment in which a man with my illness can lead a normal and full life and be as productive as before. I lead a very quiet life, move around very little physically, but feel that mentally I am embracing the globe because my book, a history of medicine from early beginnings to the present, takes me all over the world and through five thousand years of human civilization. I live surrounded by books in many languages from many lands, and each one opens up a world. At nine o'clock sharp I am at my desk and spend the whole morning writing. During the afternoon I attend to a very extensive correspondence which keeps me in touch with all corners of the world, write an occasional book review, and take care of the infinity of odds and ends connected with literary work, preparing bibliographies, collecting illustrations, reading proofs, and similar matters. After dinner until midnight sharp I read texts and make notes and in general prepare the following morning's writing. This schedule is by no means rigid; it may have to be modified according to the urgency of some work. I also greatly enjoy the visits of former students, of colleagues and friends who are good enough to look me up in my retreat.

Thus I feel that I am still a useful member of society, not a parasite, and that I am contributing my share to the advancement of knowledge. My adjustment was relatively easy because so far I have not had to worry about my family's livelihood or mine, and also because I am engaged in the kind of work that thrives best in the wilderness, provided you have a good library of your own and university libraries send you books. For a

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in the country, you will find the unfolding of the seasons in their eternal rhythm, the miracle of spring, the exuberance of summer, the soft melancholy of fall, and the creative pause of winter, a constant source of elation and inspiration. You soon recognize that the blossoming of a rose is a much greater miracle than atomic energy, and certainly a greater source of happiness. I find that every handicap has its compensations. I sleep badly, but this has the advantage that I see the sun rise, which I never did in the city.

Therapeutically there is very little you can do in a case of hypertension. There are drugs that reduce the blood pressure drastically, but they do not cure the underlying disease and simply destroy the compensating mechanism. The best we can do is accept the disease as a permanent factor in our life, adjust our mode of living to it, keep our weight down, eat and drink moderately, and rest from time to time.

Rest, complete relaxation, is a very important healing factor. Formerly I spent every Sunday working because during the eight months of the academic year Sundays are the only days that you can devote entirely to research and writing. Now I rest on Sundays, attend to my garden, and about once a month I spend a Sunday in bed resting and fasting. These are red-letter days for which I always save up a book that I am particularly anxious to read. I think the importance of fasting has not been sufficiently recognized. A forty hour fast during which you consume nothing but fruit juices decongests the organism and has a very beneficial effect. I also do all my writing in the morning on an empty stomach, as I found long ago that I work much better before than after meals.

And so with three incurable diseases I have been very fortunate, and I only wish that things may continue as they are for a few more years so that I may complete my work. And I also wish that I may be granted to end my life at home and not in the hospital. I have a horror of the hospital, that blend of penitentiary and third class hotel. Of course we need hospitals, and we must be grateful that there are so many excellent ones. Many examinations and treatments are impossible or at least very difficult outside of a hospital. But it is a dreary place, nevertheless, with its sterile-looking rooms, bare walls, high beds, and the necessary but rigid routine that makes it so difficult to rest. The rooms are obviously not made to live in but to be treated in, and even the flowers that friends so kindly send us rarely succeed in brightening the room because they are no organic part of it and rather give it the appearance of a funeral parlor. How much nicer it is to be sick at home where we have our books,

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AMERICAN TRUFFLES: A THANKSGIVING FANTASIA

A ROAST turkey prepared in the good old American way with New England stuffing and served with cranberry sauce is a great dish, but I prefer my turkey truffled and served with a sauce Périgueux. This requires some preparation but is not too difficult to make once you have mastered the elements of the art of cookery. You must buy your turkey in time. Then, two days before the event, you slice some of your truffles and insert the slices delicately with your fingers between the skin and the meat of the bird without destroying the subcutaneous connective tissue altogether.

Then make the stuffing. Take some fatty tissue of the turkey, dice it, and cook it with butter, chopped bacon, chopped truffles, a small chopped onion, the whole well seasoned. After it has cooked for a while, let it cool, add plenty of *foie gras*, the liver of the turkey, more chopped truffles, and fill the abdominal cavity of the bird with this mixture. And then forget about it for two days. During that period the meat, exposed from all sides to a barrage of truffles, will become impregnated with their delicate flavor.

When the day finally comes, roast the turkey in the classical way, covering it in the beginning with paper that has been soaked in melted butter or olive oil. And, while the bird is in the oven, make your sauce Périgueux in the following way: Cook in butter minced marinated bacon and ham, add flour, brown, add slowly rich chicken stock and a glass of good old Madeira, cook in double boiler, add minced mushrooms and

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wrapped in bacon and in two layers of paper, the first soaked in oil, the second in water, and then roasted in hot ashes. A young man fell to and devoured them gluttonously, whereupon the whole company began to kid him, wondering how he had spent the last night. The doctor should know, and they all looked at him. Dressed in black as became a man of his profession, with a jabot of lace and a wig, he tried to look serious but confirmed the general suspicion. And then it suddenly occurred to him that, while he liked truffles like everybody else, he knew very little about them, and he decided to find out more.

Actually he did very little himself. He tells us quite candidly that the analysis was made by a friend. His own major effort was to look up the literature. If anybody should have information about truffles it certainly would be a member of the Academy of Sciences, and indeed, in the *Mémoires de l'Académie Royale des Sciences* he found a paper, "Observations sur la Végétation des Truffes," that had been presented on February 25, 1711, by Monsieur Geoffroy le Jeune. Claude-Joseph Geoffroy (1685-1752), a pharmacist by profession, was remembered as having been an excellent chemist and botanist, and the author felt that the best he could do was to paraphrase his paper, adding a remark here and there, which he actually did.

Since the truffle is a subterraneous fungus, it therefore was very puzzling to eighteenth century naturalists. They agreed that it must be a plant, not an excrement of the earth as some ancients had thought, yet a plant that had neither roots, stem, leaves, or flower. Truffles had appeared on French menus since the end of the fifteenth century, and both Geoffroy le Jeune and Pennier de Longchamp were familiar with their growth, cultivation, and gathering. The conditions they picture are very much the same as still exist today. They tell us that truffles grow in uncultivated reddish soil at the foot and in the shadow of trees, particularly oaks. And indeed we know that they grow best in light and porous calcareous clay soil, in association with oaks, particularly the small evergreen oaks of southern France.

Truffles have to be "hunted," and the three methods described by our authors are still in use today. The first, and still the most popular in France, is to hunt truffles with a pig or, better, with a sow, because this is an animal that loves truffles and has a very fine nose. A well-trained pig may find over twenty pounds of truffles in one day during the season. But whenever it finds a truffle, which is then taken away, you must compensate the pig with a few acorns "because otherwise," Pennier de Long-

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vated in America; and a review of American publications on medicine and the auxiliary branches of science (New York, 1812, third hexade, vol. III, pp. 335-337):

Reasons for supposing that the Truffle is a native of the United States. In a letter from D. Mitchill, to Caspar W. Eddy, M.D., dated Washington, March 31st, 1812:

Some years ago, I received from Dr. Sibley in North Carolina, a number of roundish masses, resembling yams. They were of a pure and delicate whiteness within, and covered with a brown or blackish skin. The impression I had at that time, was, that they were the roots of a plant called Tuckahoe. But I knew not what kind of vegetable, Tuckahoe was.

On further inquiry, I learned that the substances I possessed, were not roots, or if they were, they had neither radicles, buds, stems, leaves, or blossoms. This led me to examine them again, when I satisfied myself that they were *cryptogamous productions*, of the *Lycoperdon* family. In this state of mind, I remained until very lately, when I received another specimen, and a descriptive letter from Dr. Gray, of Jerusalem in Southampton county, Virginia. It is dated January 1st, 1812, and contains the following intelligence: "I have been withheld from answering the letter which I had the honour to receive from you some weeks ago, partly by my professional engagements, and partly with a view of collecting more information concerning the vegetable in question. In this I have been disappointed. Every person of whom I inquired concerning it, has given precisely the same account, corresponding intirely with what I knew of it. I have seen it taken out of the earth at various seasons of the year, but oftenest in the spring, when it is presumed its foliage or fructification, if it had any, would be visible. I have examined the external surface, and dissected it with a view to discover if it ever had possessed a stalk or root; presuming that I might be able to discover from the direction of the fibres of the bark, whether such things had previously existed. But upon the most minute investigation, I have never been able to discover a vestige of either. The bark is of a brownish ash-colour, sulcated, and very much resembling in appearance, the root of the Papaw-gum, a species of *Nyssa*. It is thin, but considerably tough.

The pulp, if it may be so called, is of a snowy whiteness; and when newly dug up, soft, and abounding in a somewhat acrid juice. In this state it is said to have been used by the Indians, as a remedy in Diarrhoea.

On being dried, it intirely loses its acrimony, and acquires a bland, farinaceous, and slightly mucilaginous taste. I have no doubt it might be made a very agreeable and nutritious article of food. Its name induces one to believe that it was used in this way by the aborigines; the word *Tuche* or *Tuchai* signifying bread in several of the dialects. I believe the Tuckahoe to class among the cryptogamia. Its being intirely subterraneous, will be a barrier to the discovery of its amours. It is my design to transplant several into my garden, next spring with a view to investigate them more fully; and more especially to discover how far they may be applicable to culinary purposes. Should it be discovered that they are capable of considerable propagation, I have no doubt, they will at some future time, be an important article of agriculture.

Hogs are extremely fond of them. They inhabit, for the most part, a light rich

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never heard of its being used for any thing, except to make starch (?). He has never been able to get any animal, fowl, or insect to eat it."

The specimen, resembling in external appearance a piece of a root, was over seven inches long, and showed on transversal cut an oblong shape of respectively three and five inches diameter. The cortical part is of a brownish gray color, about one sixteenth of an inch in thickness, very rough, with longitudinal furrows and concentric, elevated rings; in several places it was contracted and constricted by deep depressions. The interior part of the fresh fungus is soft, easily to be cut with a knife, homogeneous; without any structure, and of a creamy white color. Exposed to the air it soon begins to harden, deep cracks forming in every direction, and ultimately the substance becomes very hard and tough. In this hardened state it is almost impossible to powder it. The best way to reduce it to powder is to lay it in warm water, wherein it swells, and then to break the softened mass with a pestle.

The fungus under my observation has a nucleus in the form of a root, apparently, of a coniferous tree. This root goes lengthwise through the whole fungus, and has a diameter of about three fourths of an inch. This root is deprived of its cortical part, but the white substance of the fungus has, where it is in contact with the root, a different appearance; it has more of a fibrous texture and spongy appearance, while the main portion of the fungus has become quite hard and tough. No doubt the cortical part of this root gave in a certain state of decay the first cause to the formation of the fungus.

The author then gives a detailed chemical analysis which reveals that the fungus contains pectose, a little sugar, and two acids, one of which is oxalic acid, but no starch and no gum. This made it clear that the art of cookery had nothing to expect from that fungus.

My last hope was the U. S. Department of Agriculture, that great progressive scientific institution of our government. If somebody knew about American truffles they would know. I wrote and immediately received a very courteous answer, for which I am much indebted to Mr. T. Swann Harding, Mr. J. A. Stevenson, and Dr. E. B. Lambert. But the news was sad. I learned that none of the truffle species of economic importance had been found in the United States, although several small species did occur in California, Minnesota, and New York. Quite apart from the fact that American truffles should by definition be bigger and better than European ones, it was all too obvious that those small species were not the right kind.

§

If there are no American truffles of the best species, why do we not grow them? We have the soil that is needed. We have oaks or could import

ABOUT THE AUTHOR

Henry E. Sigerist, M.D., considered by many to be the greatest medical historian of our time, if not all time, was born in Paris in 1891. At an early age he was attracted to the study of languages. By the time he was fifteen, he was well versed in French, German, English, and Italian and was familiar with Greek, Latin, and Arabic. Shortly thereafter, he expanded his studies to include Hebrew, Chinese, and Sanskrit. Dissatisfied with the limitations of philology, he turned to science, and finally to medicine, to receive his M.D. at Zurich in 1917.

In his own words, "I refused to specialize. My interests were very broad, and I drifted into a field where I could combine all my interests: medical, philological, historical, and sociological." Ultimately Dr. Sigerist did become a "specialist," in that he was one of the few dynamic medical historians of all time.

Dr. Sigerist emerged supreme in his field after refusing the advice of his colleagues, who called the history of medicine "a hobby for retired practitioners." From his study of the history of medicine grew his original and ingenious theories on the true purpose of medicine and its value to mankind. The medical world eventually came to accept many of his ideas and concepts and saw fit to award him many well-deserved honors, including the Sudhoff and Welch medals for outstanding achievement.

He held many important posts, including those of Professor of the History of Medicine at the University of Leipzig and Director of the Institute of the History of Medicine at the Johns Hopkins University. In 1947 upon giving up the post at Johns Hopkins, he was appointed Research Associate by Yale University, a position which he held in absentia after returning to Switzerland to write a multivolumed history of medicine. He also served as President of the American Association of the History of Medicine and as President of the History of Science Society.

To the disappointment of many, Dr. Sigerist succeeded in completing only two volumes of his projected eight volume history of medicine. Ill health and, finally, his untimely death on March 17, 1957, at the age of sixty-five, ended his hope of the completion of this monumental task.

Despite the fact that his greatest project remains unfinished, his many inspired writings remain as a living tribute to the life and work of a dedicated humanist and historian and a great man. As is stated in the Introduction to this book, "No one will again be able to write of medical history uninfluenced by Sigerist's ideas."

cians and surgeons, the members of which would pledge themselves never to eat any truffles in whatever form they might be served.

And so I am afraid that we collectivists who simply adore regimentation and therefore like to eat our turkey truffled with sauce Périgueux will have to wait until the war is over and we again can get truffles from France. And this year we shall for once be individualists and shall prepare our Thanksgiving turkey like everybody else, in the good old American way. See Fannie Merritt Farmer, *The Boston Cooking-School Cook Book*, seventh edition, completely revised by Wilma Lord Perkins, with new illustrations, Boston, Little, Brown & Co., 1942: p. 393, "Roast turkey"; p. 211, "New England stuffing: 12 slices bread, $\frac{1}{2}$ inch thick. . . ."

were frozen and could not be changed without special authorization, which, unlike in America, was and still is difficult to obtain.

This made the task of the historian and bibliographer much easier, but even today confusions occur very frequently, chiefly as the result of carelessness. It is almost unbelievable how many people are unable to copy a name correctly, and once a mistake gets into print or into an official document it is difficult to eradicate.

Being interested in the sources of such mistakes, I watched the misspellings of my own name and the following story, I am sure, could be duplicated by every one of my colleagues.

My family name comes from the Latin *sacristanus*, the sexton in the church. In upper Italian dialects, the ending was dropped and the word became *sacrista*. It penetrated into the Allemanic German of Switzerland and south Germany where it became *sigrist*, the word still used to designate the sexton. The pronunciation, however, varied. The first i was sometimes long, sometimes short, and the word was sometimes pronounced in two, sometimes in three, syllables. As a family name it was therefore spelled Siegrist, Siegerist, Sigrist, or Sigerist. Since in Switzerland most families of this name spell it Siegrist, my name was very frequently misspelled in that country. More than once I had to have an official document rewritten because the clerk was unable to copy the name correctly, and whenever I published a paper in a Swiss journal I was pretty sure that I would have to correct the name on the galleys. I have no doubt that Professor Samuel Eliot Morison of Harvard has the same difficulty in keeping the second r out of his name. Outside of Switzerland, where my name is not frequent, there is no reason for its being misspelled.

My book *Einführung in die Medizin* was first translated into Swedish. When I received copies, I saw that my name appeared on the cover and on the title page as Henry M. Sigerist. My German publisher protested, and the Swedish publisher very obligingly had a new title page and a new cover made, but a good number of copies had already been sold and Swedish librarians will have to find out what M stands for.

Two years later, in 1933, a Dutch translation of the same book was published in Holland. It was prepared by my colleague and friend J. G. de Lint. On the title page my name was H. E. Sigerist, but in the index of the book I was listed as: Sigerist, Henry Eduard.

Again a few years later, in 1936, the same book was translated into Chinese. There my name appeared in beautiful Chinese characters, but

Personally I have no feeling in the matter because I really do not care what people call me. If for some unknown reason the Library of Congress chose to list me as Genri Ernestovich Sigerist or as Abu Erica Ibn Ernest Henry Sigerist el-Barizin, I would not have the slightest objection. The example, however, shows that it is sometimes difficult to ascertain a man's correct name and that such seemingly authoritative sources as the Catalogue of the Library of Congress are anything but reliable in this matter and must be used cautiously and critically.

The English language is a marvelous instrument of precision and clarity. In English we can develop our thought in short sentences which fit together like the glass bricks with which we build a modern house. This does not mean that long sentences are impossible in English. One of the best stylists I know, Virginia Woolf, begins a superb essay, "On Being Ill,"¹ one that physicians would do well to read, with the following sentence:

Considering how common illness is, how tremendous the spiritual change that it brings, how astonishing, when the lights of health go down, the undiscovered countries that are then disclosed, what wastes and deserts of the soul a slight attack of influenza brings to view, what precipices and lawns sprinkled with bright flowers a little rise of temperature reveals, what ancient and obdurate oaks are uprooted in us by the act of sickness, how we go down into the pit of death and feel the waters of annihilation close above our heads and wake thinking to find ourselves in the presence of the angels and the harpers when we have a tooth out and come to the surface in the dentist's arm-chair and confuse his "Rinse the mouth—rinse the mouth" with the greeting of the Deity stooping from the floor of Heaven to welcome us—when we think of this, as we are so frequently forced to think of it, it becomes strange indeed that illness has not taken its place with love and battle and jealousy among the prime themes of literature.

This certainly is a long sentence but it is clear as crystal from beginning to end, and what a world it evokes! One sentence makes us remember all the illnesses we ever had. Only a great poet can write so well, and we pedestrians must remain closer to earth.

The two prerequisites for good writing, particularly on subjects such as science and learning, are clear thinking and command of the language in which one writes. I always found that people who thought clearly were able to express themselves clearly, be it orally or in writing. I have heard many very poor lecturers, and they were invariably people whose thought was confused, who jumped from one subject to another, began sentences without finishing them, and in general were just thinking aloud but not logically. My own teacher in medical history, Karl Sudhoff of the University of Leipzig, was one of them. His knowledge was formidable, and he simply poured it out over his audience, in an undigested way, and his writing was often confused also. A lecture, just like a paper, must have a beginning, a development, a climax, and an ending. And let me add that every lecture, even if it is just a routine classroom lecture, should be prepared very carefully. I have been lecturing in many countries, in many

¹ The essay is included in the collection *The Moment and Other Essays*, New York, Harcourt, Brace & Co., 1948.

are different. This method has the great advantage that it improves your lectures, because you have to think while you talk, which is usually not the case when you read a manuscript, and because you talk to an audience that is looking at you, not to unseen readers. It has the disadvantage, as some of my friends have experienced, alas, that it may take some time before they receive the promised manuscript because once the lecture is over other demands are piling up on you.

Some people write a paper in longhand or on the typewriter, then re-write it several times until they are satisfied with it. Emil Ludwig, a profuse writer, once told me that, when he had the materials for a book ready, he wrote it very quickly in shorthand. Every evening he sent what he had written to a secretary who lived at the other end of Switzerland. Two days later he received the typed script, corrected it, and thus had a book ready for the press in a very short time.

My method of writing is very different, but it is one which has such highly respected predecessors as Émile Zola, Guy de Maupassant, and, I am sure, many others. Once I am ready to write I make a short outline, of not more than one page, of the paper or, in the case of a book, of the chapter. Then every day I write a set number of pages in absolutely final form, ready for the press, with footnotes and all that goes with it. It is a slow process; I write in longhand in copybooks of folio size that I have made especially for me. I write on the right hand page only, the one to the left being left blank for footnotes and minor changes. As a rule I write five pages a day or about 700 words from 9 to 12 o'clock in the morning. It is not much, but if you do it for 300 days a year you will produce quite enough literature. The rest of the day you need for research, for the preparing of next day's writing, for the correction of galley proofs, correspondence, and an infinity of current affairs.

I know it is generally recommended that scientific papers be as short and as factual as possible. As a result they are informative, to be sure, but make frightfully dull reading. I know of famous medical journals in which every article is edited or even rewritten entirely by a highly competent staff of elderly ladies according to set standards, and the result is that every article reads as if it had been written by the same person. This is just fatal. No two individuals are alike, and no matter how factual an article is we wish to get a grasp of the personality behind it.

I said that the prerequisites of good writing are clear thinking and command of the language in which you are writing. The latter is a sore spot, particularly in America. We should expect that a medical student

make it more meaningful, and also to learn to express ourselves better. We do not read to kill time, because life is too short and time too precious to be killed thoughtlessly. There are moments, to be sure, that we would have preferred not to have lived, an unpleasant illness or a tedious journey. These are the moments when there is time for a thriller, which makes us forget ourselves, our environment, and everything, but I confess that I never developed a taste for them unless they had real literary value.

What, then, should the physician read? Quite generally, I may say, he should read what other educated people read. There are no belles-lettres for physicians and others for bankers. I think it is a very good habit to begin the day with a poem. Most busy people, and physicians are busy people, wake up in the morning when the alarm clock rings without being quite rested. Or they have taken a tablet in order to sleep, have slept deeply, but still do not feel quite normal. When they shave they remember what a heavy schedule they have ahead of them and wonder how they will survive the day. When they come down to breakfast they already feel gloomy. They open the paper and read that everybody hates everybody else. In this state of mind they go to the office and the day's drudgery begins. Why not set the alarm clock ten minutes earlier and before getting up read a poem or two? It will resound in you through the day and may change your entire outlook. This morning I happened to have Dante Gabriel Rossetti's poems on my table. I opened the book at random and read:

The blessed damozel leaned out
From the golden bar of Heaven
Her eyes were deeper than the depth
Of waters stilled at even;
She had three lilies in her hand,
And the stars in her hair were seven.

After I had read the poem I knew that the day was going to be a good one, and indeed I wrote more than five pages without inhibitions, and whenever something seemed to go wrong I saw the blessed damozel with her lilies and stars: "she bowed herself and stooped Out of the circling charm; Until her bosom must have made The bar she leaned on warm. . . ." And I remembered the music Debussy wrote to the poem. He was in Rome at that time, laureate of the Rome prize, residing at Villa Medici. He was not happy there, although he liked roaming through the eternal city and browsing in the numerous antique shops. But he missed his native Paris, and every year he had to send to the Paris Conservatory

one third were books written before 1900, many of them before 1500, one third were written between 1900 and 1940, and one third were new books, many of them copies presented by their authors.

There is much talk in America today about "The Great Books," the hundred great books of St. John's College, the great books published not so long ago in new editions and translations under the auspices of the University of Chicago. Clubs have been organized in many cities where people from all walks of life come together to read and discuss the works of Plato, Thomas Aquinas, Descartes, and other great writers of the past, who have left such a deep imprint on Western thought. This certainly is a development about which we can only rejoice as it means that America is coming of age. I know of many businessmen and also physicians who are attending the meetings of these clubs, and I think it would be very interesting to find out after about ten years what effect the study of these books has had on them. Has it changed their general outlook, their attitude towards life and the world at large; have their actions become different? This is extremely important, because the ideologic conflict of our time is not one between political and economic theories but between materialism and spiritualism. I cannot discuss this point in any detail as it would require another essay. I may only say that in my opinion the ideologic conflict between West and East is not one between the United States and Russia but rather between the United States and Russia on one side and India and other Asian countries on the other side.

The study of the great thinkers of the past undoubtedly is very important as it will help us to acquire a more correct sense of values. It will teach us that the accumulation of technical gadgets and material goods in general is of no importance, that it is better to be wise than to be rich, that there is no point in being the wealthiest corpse in the cemetery. It will teach us that freedom is a matter of the individual and has very little to do with political institutions. You are free when you are free from material needs and free from passions. A man whose heart is full of ambition and hatred is a slave even if he lives in the so-called "free world."

One should begin early with the reading of the world's classics. I read hundreds of them in the formative years from twelve to twenty-five, and I have kept reading and rereading them to the present day. I have a small library of about 500 volumes next to my bed, books from all countries and in many languages. They are the books that have accompanied me through life and that I would not like to miss, Greek and Chinese clas-

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